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KNOWLEDGE, ATTITUDE AND WILLINGNESS TOWARDS ORGAN DONATION AND TRANSPLANTATION AMONG MEDICAL STUDENTS IN A TERTIARY INSTITUTION IN NIGERIA

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ABSTRACT

Introduction: Organ donation and transplant have become one of the greatest advances in medical science. It is increasingly used worldwide as a treatment protocol for end-stage organ failure and disease. The aim of this study is to assess the knowledge, attitude and willingness towards organ donation and transplantation among medical students in Ladoke Akintola University of Technology, Ogbomosho, Oyo State.

Methods: This is a cross-sectional study using a quantitative method of data collection. A semi-structured, self-administered questionnaire was used in collection of data from 181 respondents using a multiphase sampling technique. Data was analyzed using IBM SPSS version 27.0 at 95% significance with a p-value of <0.05. Quantitative data were presented using frequency distribution tables, graphs, and charts and association between categorical variables was assessed using chi-square.

Results: This study showed that majority of the respondents (154, 83.7%) possess good knowledge of organ donation while a few (30, 16.3%) exhibit poor knowledge. In this study, 51.6% (95) of respondents are not willing to donate their organs, but 48.4% (89) are willing to donate. Academic level of respondents was statistically significant with both knowledge as well as attitude towards

organ donation and transplantation. The reason 62 (33.7%) of respondents are not willing to donate their organs is because they feel organ donation can lead to death.

Conclusion: Academic level of respondents was statistically associated with knowledge and attitude towards organ transplantation. Health education in raising the awareness of the shortage and subsequent need of organ donation and transplantation is needed.

Key words: Organ donation, Transplantation, Willingness, Medical students

INTRODUCTION

Worldwide, organ transplants are widely used as a treatment protocol for end stage organ disease or failure. Organ donation is one of the surviving procedures that with recent advances in technologies, has led to improvement in the life expectancy of end-stage patients.¹ However, most countries are presently facing a huge dearth of organs for transplantation. Medical students, as future doctors can be involved and engaged with the responsibility of promoting organ donation showcasing adequate awareness and encouraging communities to get involved in organ donation.²

Examples of organs that can be donated include the kidney, skin, liver, pancreas,

heart, lung and some tissues like the cornea, heart valves, etc.³ Organ donation can either be from a living or dead donor.⁴ The kidney was the first human organ to be successfully transplanted in 1954. By the late 1960s, successful liver, heart, and pancreatic transplants had been carried out. Lung and intestine organ transplant surgeries first started in the 1980s.⁵

Globally, the demand for organs for transplantation continues to exceed the supply capacity.^{3,6} It's been recorded that in the United States alone, more than 100,000 patients are on the waiting list for organ transplant,⁷ and on the average, almost 20 people die every day, waiting for an organ endlessly.⁸ Furthermore, the disparity between supply and demand of human organs has been exacerbated by the COVID-19 pandemic, the impact of which has resulted in an 18% decline in the number of global transplants.⁹ In addition, lack of awareness and correct knowledge coupled with myths and misconceptions regarding organ donation, which are driven by sociocultural factors contribute to the huge gaps of organ donation rate.³

Nigeria, like many African countries, faces unique challenges in organ donation and transplantation. The country's organ transplant activity is relatively recent, dating back to 2000, and is primarily limited to kidney transplants. The lack of a robust legal framework, inadequate healthcare facilities, and the absence of national programs for organ donation contribute to the scarcity of organ donors and transplants in Nigeria.⁶ [Click or tap here to enter text.](#)

In Nigeria, organ donation is gradually gaining momentum as a result of which many researches are being carried out on the subject matter.^{10,11} However, organ yield is still significantly low, leading to significant concerns about organ shortage.¹² Medical students are future healthcare professionals. Health-care professionals are the most critical link in the organ procurement process, their knowledge and attitude are essential factors in the creation and promotion of an environment

that has a positive influence on organ donation rates.¹³

This study therefore assessed the Knowledge, Attitude and Willingness towards Organ Donation and Transplantation among Medical Students in Ladoke Akintola University of Technology, Ogbomosho Oyo State.

METHODS

Description of Study Area

Ogbomosho is a city in Oyo state, southwestern Nigeria. It has five local government areas which are Ogbomosho North, Ogbomosho South, Orire, Ogo-oluwa, and Surulere. Ogbomosho North local government area serves as a home to Ladoke Akintola University of Technology (LAUTECH), and its teaching hospital.

Ladoke Akintola University of Technology is a state-owned tertiary institution, established in 1990. It enrolls over 30,000 students per session with a population of 80-150 medical students admitted per session. The university serves not only as an educational center but also a crucial pillar of the local community, contributing significantly to the region's socio-economic and cultural fabric. It provides a conducive setting for academic pursuits, and the teaching hospital is an integral component of the healthcare infrastructure of Ogbomosho city.

Study design

The study was a descriptive cross-sectional study.

Study population

The study was conducted among medical students (300 level - 600 level) of LAUTECH Ogbomosho.

Inclusion Criteria

Registered 300-600 level medical students of LAUTECH Ogbomosho.

Exclusion Criteria

Individuals who were seriously ill during data collection were excluded.

Sample size calculation: Minimum sample size for the study was calculated with prevalence of knowledge of organ donation from a previous study,¹⁴ using Leslie Fisher's formular

$$n = \frac{z^2 pq}{d^2}$$
$$n = \frac{(1.96)^2 \cdot 0.88 \cdot 0.12}{(0.05)^2}$$
$$n = \frac{3.84 \cdot 0.1056}{0.0025}$$
$$= \frac{0.3568}{0.0025}$$
$$= 142.72$$

After adding the non-response rate of 20%, the minimum sample size increased to 179 respondents. A total of 190 respondents were interviewed but 184 returned a well filled questionnaire, giving a response rate of 96.8%

Sampling technique

A multi-staged sampling technique was used.

Stage 1: The list of the students in the Department of Medicine and Surgery was obtained from the College of Health Science for the period of the data collection and students were stratified into 300-600 level.

Stage 2: A proportional allocation was done to determine the number of respondents to be chosen from each of the four selected class levels. Subsequently, a systematic sampling was used to select respondents from each of the classes until the desired respondents for each class was reached.

Instruments for data collection

A semi-structured, self-administered questionnaire adopted from a standardized questionnaire on Organ Donation and Transplantation was administered to all respondents [Organ Donation & Knowledge Survey (ODTK), Organ Donation Attitude Survey (ODAS), Modified Organ Donation Attitude Survey, National Survey of Organ Donation Attitudes and Practices].

Data collection method

A semi structured self-administered questionnaire was used as the instrument for the study. Research assistants were five

medical students who were excepted from the study.

Data analysis

The questionnaires were sorted out and entered into a computer and the obtained data was analyzed using Statistical Product and Service Solutions (SPSS) version 27.0. Data was presented using frequency distribution tables, graphs, and charts. Association between categorical variables was assessed using chi-square.

Measurement of outcome variables

The questionnaire for assessing students' knowledge and attitude toward organ donation and transplantation has two subscales: knowledge (questions 1- 13) and attitude (items 14-26). Responses to the items dealing with the knowledge subscale were based on a two-point scale, 'Yes' or 'No'. The 'Yes' response was given a score of 1 and the 'No' response was given a score of 0. The scores of the knowledge subscale ranged from 0 to 13. Individual scores were summed and the mean gotten. Every respondent with scores above the mean were considered to have good knowledge of organ donation and transplantation while those with scores below the mean were considered as having poor knowledge. The attitude subscale was rated on a 5-point Likert Scale for determining levels of agreement (from strongly disagree=1, to strongly agree=5). The score of attitude subscale ranged from 13 to 65. The higher the score, the better the attitude toward organ donation and transplantation

RESULTS

Table 1 shows the socio-demographic characteristics of respondents. 96 (52.2%) were females and 88 (47.8%) were males. The ethnic composition is predominantly Yoruba, constituting 97.8% of the respondents. Regarding religion, 123 (66.8%) identify as Christians, with 61 (33.2%) following Islam. The age distribution spans from 16 to 36, with a mean age of 22.74 (± 2.8) years. Additionally, the academic levels of 300, 400, 500, and 600 have respective representations

of 43 (23.4%), 71 (38.6%), 32 (17.4%), and 38 (20.7%) respondents.

Table 2a shows that 181 (98.4%) of the 184 respondents have heard about organ donation and transplantation. The primary sources of information include social media (124 respondents, 67.4%). Participants exhibit an understanding of specific organs that can be donated, with kidneys 178 (96.7%) and hearts 150 (81.5%) being particularly well-known. Majority of respondents 175 (95.1%) believed organ donation would save other people’s lives.

Table 2b shows that majority of respondents 172 (98.9%) express motives such as saving lives for organ donation and transplantation. One hundred and thirteen (61.4%) indicated that a single donor can donate to multiple recipients and 85 (46.2%) respondents understand that family member of a deceased person can pledge his/her organ even if the person has not signed a donor card in his/her lifetime. Majority of respondents 94 (51.1%) have not heard about an organ donation card.

Figure 1 shows categorization of respondents based on knowledge. 151 (83.4%) possess

good knowledge, while 30 (16.6%) exhibit poor knowledge (Mean score of 8.5 ± 2).

Table 3 shows the attitude of respondents towards organ donation and transplantation. Some misconceptions are evident, as 65 (35.9%) respondents associate organ donation with human trafficking. 128 (70.0%) respondents expressed the expensive cost of organ donation and 121(66.9%) disagree that they may need organ transplant later in life.

Figure 2 shows that 58 (31.5%) of respondents exhibit a positive attitude, while a majority of respondents 126 (68.5%) demonstrate a less favorable disposition toward organ donation (Mean score of 23 ± 4)

Table 4: Eighty-nine (49.2%) expressed their willingness to donate their organs if there happen to be a need for it in the future while 92 (50.8%) will not be willing. Fear of dying from the procedure was identified by 66 (33.7%) respondents as a reason why they will not be willing to donate any of their organs.

Table 1: Socio-Demographic Characteristics of Respondents

Variable		Frequency	Percent (%)	Mean (SD)
Age	15-19	21	11.4	22.74 (± 2.8)
	20-24	115	62.5	
	25-29	47	25.6	
	>25	1	0.5	
Sex	Male	88	47.8	
	Female	96	52.2	
Ethnicity	Yoruba	180	97.8	
	Hausa	1	0.5	
	Igbo	3	1.6	
Religion	Christianity	123	66.8	
	Islam	61	33.2	
Level	300	43	23.4	
	400	71	38.6	
	500	32	17.4	
	600	38	20.7	

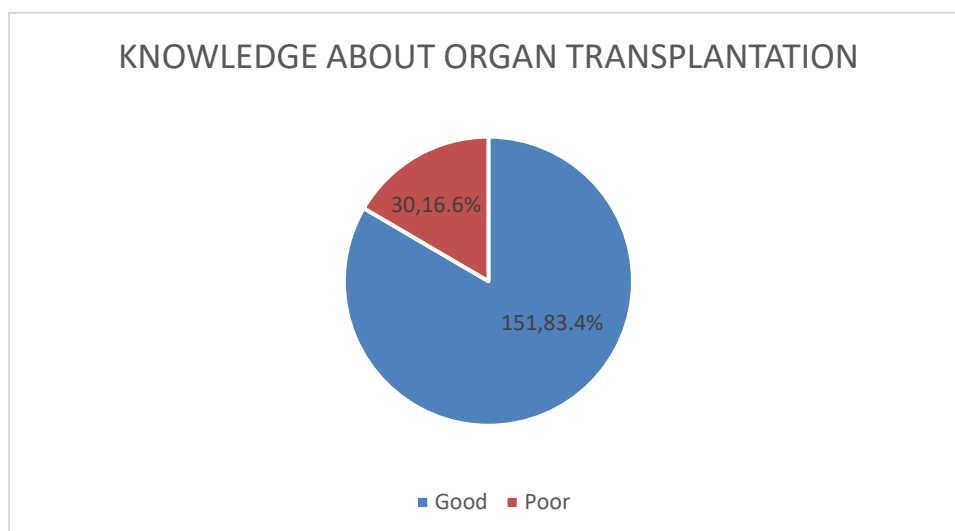


Figure 1: Respondents' Level of Knowledge of Organ

Table 2a: Respondents' Knowledge of Organ Donation and Transplantation

Variable	Frequency	Percent (%)
N=184		
Have you heard about organ donation?		
Yes	181	98.4
No	3	1.6
** Source of Information		
Radio	44	23.9
Television	70	38.0
Social Media	124	67.4
Newspaper	27	14.7
Friends	38	20.7
Family Member	23	12.5
Others	0	0.0
Would organ donation save other people's live		
Yes	174	96.1
No	7	3.9
** Organs that can be donated		
Heart	150	81.5
Kidney	178	96.7
Liver	153	83.2
Brain	32	17.4
Intestines	55	17.4
Pancreas	43	23.4
Bone	70	38.0
Skin	126	68.5
Ligament	62	33.7
Eye Tissue	86	46.7
Possible donors		
Living Healthy Person	175	95.1
Brain Dead Person	144	78.3
Naturally Dead Person	38	20.7
I don't know	2	1.1

** Multiple Responses Allowed

Table 2b: Respondents' Knowledge of Organ Donation and Transplantation

Variable	Frequency	Percent (%)	
N=181			
** Reasons for Organ Donation	To save life	172	95.0
	To brag	0	0.0
	For Charity	67	37.2
** Contraindication for organ donation	If donor is HIV Positive	164	89.1
	If donor has active cancer	148	80.4
	Organ to be donated is badly injured	142	77.2
	Active legal case related to the death of the donor	110	59.8
	Donor with Hepatitis B	111	60.3
	Donor with Hepatitis C	139	75.5
	I don't know	7	3.8
	** Factors to be considered before organ donation	Age of Donor	152
Age of Recipient		123	66.8
Immune Status of Recipient		152	82.6
Immune Status of Donor		162	88.0
I don't know		4	2.2
Can a single donor donate to multiple recipients	Yes	113	62.4
	No	55	30.4
	I don't know	13	7.1
Have you heard about organ donation cards	Ye	86	46.7
	No	94	51.1
	I don't know	1	2.2
Can family of a deceased person pledge his organs even if the person had not signed a donor card during his lifetime	Yes	85	46.2
	No	64	34.8
	I don't know	35	19.0

**** Multiple Responses Allowed**

Table 3: Attitude of Respondents Towards Organ Donation and Transplantation

Variable		Frequency	Percent (%)
N=181			
I can donate my organ	Agree	67	37.0
	Indifferent	34	18.8
	Disagree	80	44.2
I cannot get organ donation from a relative	Agree	23	12.7
	Indifferent	36	19.9
	Disagree	122	67.4
I feel organ donation can be deadly	Agree	52	28.7
	Indifferent	28	15.5
	Disagree	101	55.8
I feel organ donation is associated with human trafficking	Agree	65	35.9
	Indifferent	25	13.8
	Disagree	91	50.3
I will be willing to donate my organ if I experience brain death	Agree	70	38.7
	Indifferent	39	21.5
	Disagree	72	39.8
I will donate my organ if he has a beneficial interest	Agree	69	38.1
	Indifferent	37	20.4
	Disagree	75	41.4
I think someday I may need organ transplant	Agree	25	13.8
	Indifferent	35	19.3
	Disagree	121	66.9
Organ transplant is too expensive	Agree	128	70.7
	Indifferent	23	12.7
	Disagree	30	16.6
I can never need organ donation	Agree	52	28.7
	Indifferent	39	21.5
	Disagree	90	49.7

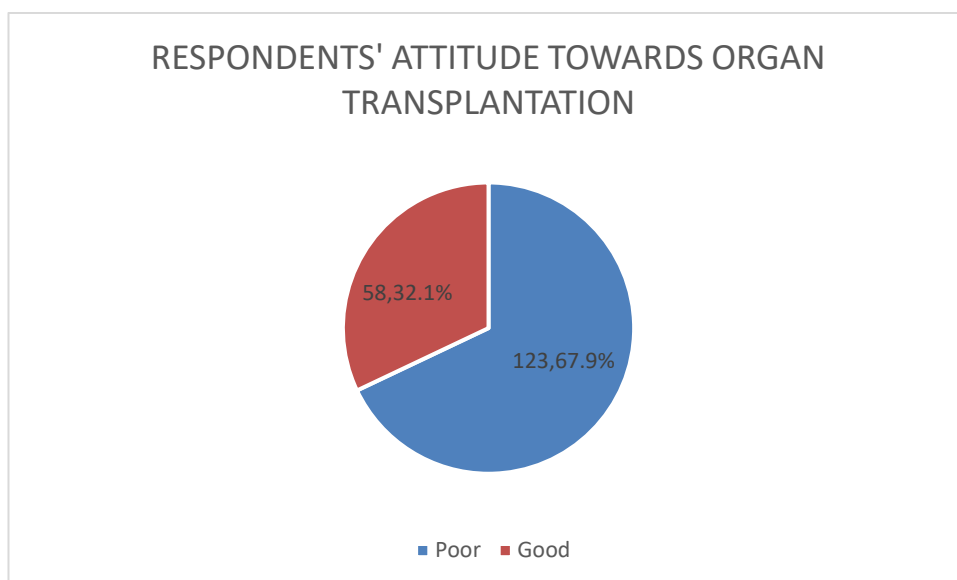


Figure 2: Respondents' Attitudinal Level Towards Organ donation

Table 4: Willingness of Respondents Towards Organ Donation and Transplantation

Variable		Frequency	Percent (%)
N=181			
Have you donated any of your organs before	Yes	1	0.5
	No	180	99.5
Will you be willing to donate later in the future if need be?	Yes	89	49.2
	No	92	50.8
** If no why?	I don't know much about it	33	66.3
	I am afraid it could lead to death	62	33.7
	I don't trust our health system here in Nigeria	50	27.2
	I don't believe that the transplant would be used correctly	7	3.8
	I find it irrelevant		
	It is against my religion		
	My family will never agree	2	1.1
	There may be complications	5	2.7
	I do not believe in organ donation	3	1.6
	I do not wish to go through the disfiguring surgery involved	40	21.7
		0	0.0
	12	6.5	
Would you like to be a part of an organ donation group in the country	Yes	85	47.0
	No	96	53.0
Would you motivate others for organ donation	Yes	141	77.9
	No	40	21.1

** Multiple Responses Allowed

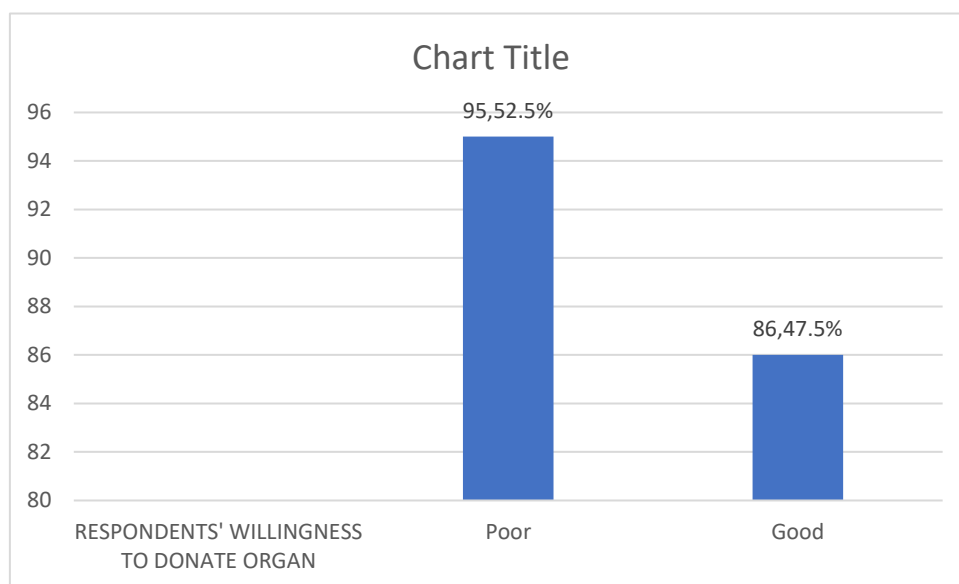


Figure 3: Respondents' Willingness to Donate Their Organs

Table 5: Association Between Respondents' Socio-demographic Characteristics and Knowledge Scores

Variable	Knowledge Score			x ²	Df	p-Value
	Poor (%)	Good (%)	Total			
Age						
15-19	2 (9.5%)	19 (90.5)	21	1.790	3	0.520
20-24	18 (15.7%)	97 (84.3)	115			
25-29	10 (21.3%)	37 (78.7)	47			
>29	0 (0.0%)	1 (100.0)	1			
Sex						
Male	17 (19.3)	71 (80.7)	88	1.123	1	0.289
Female	13 (13.5)	83 (86.5)	96			
Religion						
Christian	18 (14.6)	105 (85.4)	123	0.758	1	0.384
Muslim	12 (19.7)	49 (80.3)	61			
Level						
300	4 (9.3)	39 (90.7)	43	7.784	3	*0.050
400	18 (25.4)	53 (74.6)	71			
500	5 (15.6)	27 (84.4)	32			
600	3 (7.9)	35 (92.1)	38			
Ethnicity						
Yoruba	30 (16.7)	150 (83.3)	180	0.797	2	0.671
Hausa	0 (0.00)	1 (100.0)	1			
Igbo	0 (0.00)	3 (100.0)	3			

Table 6: Association between respondents' socio-demographic characteristics and attitude scores

Variable	Attitude Score			x ²	df	p-Value
	Poor (%)	Good (%)	Total			
Sex					3	0.077
15-19	18 (85.7)	3 (14.3)	21	6.852		
20-24	80 (69.6)	35 (30.4)	115			
25-29	28 (59.6)	19 (40.4)	47			
30-34	0 (0.0)	0 (0.0)	0			
35-39	0 (0.0)	1 (100)	1			
Sex						
Male	61 (69.3)	27 (30.7)	88	0.055	1	0.814
Female	65 (67.7)	31 (32.3)	96			
Religion						
Christian	85 (69.1)	38 (30.9)	123	0.68	1	0.795
Muslim	41 (67.2)	20 (32.8)	61			
Level						
300	37 (86.0)	6 (14.0)	43	8.655	3	0.034
400	44 (62.0)	27 (38.0)	71			
500	22 (68.8)	10 (31.3)	32			
600	23 (60.5)	15 (39.5)	38			
Ethnicity						
Yoruba	123 (68.3)	57 (31.7)	180	3.555	2	0.169
Hausa	0 (0.00)	1 (100.0)	1			
Igbo	3 (100.0)	0 (0.00)	3			

Figure 3 shows that 95 (52.5%) of respondents are not willing to donate their organs, while 86(47.5%) of the respondents are willing to donate their organs.

Table 5 shows the association between respondents' socio-demographic characteristics and knowledge score categories. The analysis reveals significant associations between knowledge scores and academic level of respondents. Those at higher academic levels tend to have better knowledge about organ donation ($p = 0.05$). While gender ($p=0.289$), religion ($p=0.384$), and ethnicity ($p=0.671$) show no significant association.

Table 6 shows that there is a statistical association between level of study and attitude of respondents to organ donation (p -value of 0.034)

DISCUSSION

The findings on knowledge regarding organ donation and transplantation among medical students of Ladoke Akintola University of Technology, Ogbomosho, reveal that the majority of respondents have heard about organ donation, indicating a high level of awareness within the medical student community. This awareness is primarily attributed to social media, which serves as the source of information for over two-third of participants, followed by television, radio, and friends. This is comparable to what was reported by Syiemlieh in which awareness of organ donation and transplantation were high and media happened to be primary source of information among respondents.¹⁴ However, the overall knowledge score was higher in this current study compared with Syiemlieh's result where barely one third had good knowledge score. The reason for this may be

because of the difference in study population. Medical students were the study population in our study while the other study was carried out among outpatients of a tertiary institution.

The study result shows a good understanding of the organs that can be donated, with kidneys and hearts being particularly well-known among respondents. Additionally, there is awareness about the type of individuals who can serve as donors, including living healthy individuals and brain-dead individuals. This indicates that medical students possess foundational knowledge about the criteria for organ donation eligibility. However, there are some gaps in knowledge, as evidenced by the lack of awareness regarding organ donation cards among half of respondents and uncertainties concerning the ability of family members to give consent to organ donation in a deceased person. This supports what was reported by Jeremy, that medical students in Hong Kong struggle with donor registration, medical law, brain death, organ transplantation candidates, recipients, and logistics.¹⁵ This finding highlights the need for targeted education to address specific areas where misconceptions or a lack of awareness may exist among medical students.

This study reveals that out of 181 respondents, one-third of the respondents exhibit a positive attitude, while about two-third demonstrate a less favorable disposition toward organ donation. Also, almost half of respondents disagree with donating their organs, highlighting some misconceptions out of which one third of respondents associate organ donation with human trafficking. About three-fourth of respondents expressed the expensive cost of organ donation.

There is a direct relationship between the awareness of organ donation and the academic level of participants. This was closely related to the study done in Ethiopia where the level of study of respondents was statistically significant with their knowledge of organ donation and transplantation.² However, a study showed that even the medical professionals lack clarity with

regards to rules and procedures to organ transplantation. People in the medical profession may play an important role in informing society about concepts like brain death, organ donation and the importance of organ donation. The study also shows that varying levels of education among the respondents did not significantly alter the overall knowledge about organ donation. This suggests that the curriculum may adequately cover the topic, but does not necessarily influence attitudes, aligning with findings that education alone may not be sufficient to change attitudes.¹²

Cumulatively, data reveals that more than eight out of ten of respondents possess good knowledge, while less than one third exhibit poor knowledge, suggesting an overall positive trend in the understanding of organ donation among medical students of Ladoke Akintola University of Technology, Ogbomosho. The reason for this finding is not far-fetched as it is assumed that medical knowledge has a way of increasing students well of knowledge as regards organ donation and transplantation.

However, the study reveals that half of respondents are unwilling to donate their organs, while less than half of the respondents are willing to donate their organs which depicts that larger percentage of medical students of Ladoke Akintola University of Technology, Ogbomosho despite their high level of knowledge. This is lower than similar studies done where more medical student will be willing to donate their organs. Vinay et al recorded a willingness of up to 90% among medical students.¹⁶ The reason for this contrasting evidence may be as a result of the countries where the studies were conducted and the available information as well as the technical know-how of organ transplantation and donation

The study's limitations include its focus on a single medical institution, which may not provide a comprehensive view of the attitudes and knowledge levels of all medical students in the region or country.

CONCLUSION

The findings of this research provide valuable insights into the socio-demographic characteristics, knowledge levels, and attitudes toward organ donation and transplantation among the study population. The analysis revealed a diverse range of perspectives, highlighting both positive attitudes and prevalent misconceptions surrounding organ donation.

Despite a generally high awareness of organ donation, evidenced by majority of respondents reporting familiarity with the concept, there remains a notable gap in understanding, particularly regarding the safety and eligibility criteria for donation. Misconceptions surrounding the association between organ donation and human trafficking, as well as concerns about the potential lethality of donation procedures, indicate the urgent need for comprehensive educational campaigns aimed at dispelling myths and enhancing public knowledge.

Academic level of respondents was statistically significant with knowledge and attitude towards organ donation and transplantation. A little above half of respondents will be willing to donate their organs in the future, if need be, and the reason given by one third of those who may not be willing to donate their organs was because of fear of death from the procedure.

RECOMMENDATIONS

The Government should allocate funds for public awareness campaigns to inform the general population about the importance of organ donation. There should be collaboration with educational institutions to incorporate organ donation topics into the broader education system as well as formulation of policies that will streamline the organ donation process, ensuring transparency and ethical practices.

When the use of a thing is not known, abuse is definitely inevitable. Medical students should be taught on the benefits of organ donation and transplantation. This will go a

long way in modifying the knowledge of other member of the community about this issue of great public health importance. Interactive discussions should be incorporated into classrooms activities to address any concerns or misconceptions students may have about organ donation among medical students.

While this study provides valuable insights into the knowledge and attitudes surrounding organ donation and transplantation, there are several avenues for further research to explore. Firstly, longitudinal studies could be conducted to track changes in attitudes and behaviors towards organ donation over time, allowing for a deeper understanding of the factors influencing these changes. Additionally, qualitative research methods such as interviews or focus group discussions could provide deeper and broader insights into the barriers, motivators and experiences of both previous donors and recipients, offering a more nuanced understanding of the complexities surrounding organ donation.

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Conflict of interest- All the authors declare that they do not have any competing interest.

Data Availability - The materials and data used will be made available if needed.

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Ethics considerations- Ethical clearance for the study (Protocol number-LTH/OGB/EC/2023/4361) was obtained from the Ethical Review Committee of LAUTECH Teaching Hospital, Ogbomosho to ensure compliance with ethical standards. Informed consent was obtained from each

participant, ensuring that they had the autonomy to decide on their involvement. Confidentiality was strictly maintained, personal information was anonymized, and data were securely stored with restricted access limited to the research team.

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