

## ORIGINAL ARTICLE

## KNOWLEDGE, ATTITUDE AND FACTORS ASSOCIATED WITH ORGAN DONATION AMONG MEDICAL STUDENTS, ADDIS ABABA

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## ABSTRACT

**Introduction:** Organ transplantation is the most effective and desirable method of treatment for patients suffering from end stage organ failure secondary to any cause. The main problem currently facing transplant medicine lies in the discrepancy between global need for donor organs and the demand, which by many is believed to be because of lack of adequate knowledge and poor attitude towards organ donation among the public. Since medical students are the future physicians it is very important to assess their level of understanding and improve their knowledge and attitude towards organ donation.

**Objective:** To assess the knowledge, attitude and associated factors about organ donation among medical students of St. Paul Hospital's Millennium Medical College.

**Methods:** A descriptive cross-sectional study was conducted among medical students of St. Paul Hospital's Millennium Medical College, Addis Ababa, Ethiopia from March 12, 2018 to May 07, 2018. The study was conducted on a sample size of 240 medical students. Data was collected through structured self-administered questionnaire consisting of 31 questions on knowledge and attitude towards organ donation. Data was cleaned, coded and entered into computer and analyzed using SPSS version 20.0. Simple descriptive statistics such as frequency and percentage were used to summarize the results and chi-square and binary logistic regression was used to describe the association between variables.  $P$ -value  $< 0.05$  was considered as statistically significant association.

**Results:** A total of 236 students participated in the study out of a sample size of 240, making the response rate 98.3%. Amongst which 88.6% had good knowledge but only 10.2% of the participants had positive attitude. Two of the independent variables were found to have significant association with having good knowledge. Female students were found to be five times more likely to be knowledgeable than male students  $P=0.001$ ,  $COR=5.383$ , 95%  $CI$  1.963-14.758) and those who reported internet as their primary source of information were found to be four times more knowledgeable than those who reported other outlets as their source ( $P=0.004$ ,  $COR=4.041$ , 95%  $CI$  1.567-10.420). Bivariate and multivariable analysis did not reveal other significant associations between the independent variables and having positive attitude.

**Conclusion:** Over a majority of the students were found to have good knowledge but negative attitude towards organ donation. Among the independent variables female gender and having internet as their primary source of information was found to have significant association with good knowledge. Thus, it is crucial that the college and clinical departments that practice transplantation medicine take part in the theoretical teachings as well as devising a curriculum that allows for students to raise and eliminate their perceived barriers to organ donation and transplantation to improve their attitude.

*Key words:* Knowledge, Attitude, Organ Donation, Students, Addis Ababa

## INTRODUCTION

Organ transplantation is arguably one of the greatest scientific advances and remains one of the most challenging and complex fields of modern medicine (1). Organ donation can be defined as the removal and transfer of biological tissue or an organ of the human body legally from a living person through consent or from a dead person via ascent from next of kin to a living recipient in need of transplantation (2).

Experts say that the organs from one deceased donor can help up to 50 people. Transplantation of the kidney, liver, pancreas, intestine, heart, and lungs has now become commonplace in all parts of the world. In fact, transplantation is now so widely accepted and successful that the main problem facing the field today is not surgical technique, rejection primarily because of the development of safer and more effective immunosuppressive agents, or management of complications, but rather supply of organs (3-5).

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A live person can donate one kidney, a part of the lung, a part of the liver, blood or bone-marrow which can easily be transplanted. In deceased organ donation (after brain death), more organs such as the heart, pancreas and cornea can be transplanted if the patient is on the ventilator till the organs are extracted. Only healthy individuals can donate organs and the donor must be free of diseases including HIV (6). Live organ donation offers a valuable opportunity for transplantation, but cadaveric organ donation extends the possibility for reducing the gap between patients' needs and the organ supply (United Network for Organ Sharing, 2008). Living organ donation is often described as related or non-related (2). In the early days of transplantation, all donors were genetically related (7).

An enormous difference has been created between organ supply and demand for donor organs because of increase in the incidences of organ failures and lack of supply of organs (5). The waiting list of patients requiring organs is increasing day by day. Shortage of cadaveric organs for transplantation is a global problem. Some studies have suggested that knowledge, attitudes and determinants concerning this issue are influenced by many factors, including gender, educational level, occupation, socio-demographic status, income level, culture and religion. Although people generally express favorable views toward organ donation, very few actually agree to donate before they die or agree to have family members' organs donated upon their deaths. (7-11)

Efforts to increase donation rates have included public awareness and professional education programs, and law that require physicians to request that families donate the organs of deceased or dying relatives. Yet, public health attitudes to cadaveric organ donation and transplantation are a major public health problem and of importance, since prior consent of the donor or of a close relative at the time of death forms the basis for cadaveric organ donation in most developed and developing countries.

A total of 114,690 solid organs were reported to be transplanted in the year 2012 globally. Despite being a 1.8% increase in transplant rate as compared to year 2011, this still only amount to less than 10% of the global organ need (1).

Although there is scarcity of data regarding the statistics in Africa and particularly in Ethiopia. In Ethiopia, live organ donation first began in September 2015 at St. Paul Hospital's Millennium

Medical College (SPHMMC) upon the request of federal democratic Republic of Ethiopia Ministry of Health (FDRE, MOH). Preparations for recovery of organs from deceased donors began in November of 2015. For the past three years, SPHMMC has been the sole health institution providing the care of organ transplantation for patients with end stage kidney disease throughout the country. There is a worldwide shortage of donor organs in comparison to the need for transplantation. There is a significant relation between public attitude towards organ donation (OD) and availability of such organs. Thus, the main concern of most transplant surgeons is to increase the donor pool and spread the willingness of donation among healthy individuals (12).

Today's medical students are doctors of tomorrow and their awareness and attitude towards OD is equally as important. SPHMMC is a pioneer institution when it comes to transplant medicine in our country. Thus, this study aims to assess the knowledge and attitude of its undergraduate medical students towards OD. The findings of this research will shed light on the level of understanding of medical students about such an important aspect of modern medicine. Therefore, it can serve as background information for future studies. The results will be presented and if possible published on scientific journals. Outlining what can be done in relation to improving the service.

## **PARTICIPANTS AND METHODS**

This study was conducted starting from March 20 to May 18, 2018 at St Paul's Hospital Millennium Medical College, Addis Ababa. Ethiopia is located in eastern part of Africa. The land is estimated to be about 1.1 million square kilometers. The country is among the three most populated countries in Africa with total population of 106 million (2017 estimates). Addis Ababa the capital city of Ethiopia has a total population of 3.6 million.

SPHMMC is the second largest public hospital in Ethiopia with the mission to provide preventive, promotional, curative and rehabilitative health care service in the country. The hospital was built in 1969 and since then it has been a source of medical care for the underserved population. The hospital currently has 20 departments, about 389 beds with six beds in the intensive Care Unit (ICU) and 5 in pediatric ICU. The hospital has about 2,508 clinical and non-clinical staff members, 800 medical students and 753 nursing students.

Currently, the hospital is advancing its medical training in undergraduate, post graduate and fellowship programs in addition to expanding medical services with the first center for kidney transplantation and future hematology, cardiology as well as oncology center already under construction. The study was conducted from March 20 to May 18, 2018.

An institution based cross sectional descriptive study was conducted on knowledge and attitude about organ donation among medical students in St. Paul's hospital millennium medical college Addis Ababa, Ethiopia. The source population was all undergraduate medical students currently enrolled in SPHMMC. The study populations were all undergraduate medical students of SPHMMC that full fill inclusion and exclusion criteria. In this study all undergraduate medical students who were learning at the school during time of the study, who are above age of 18 years and are willing to participate in the study were included. Undergraduate medical students who were not available during the period of sample collection; under the age of 18 years and who were not voluntary to participate were excluded from the study. Outcome of interest was Knowledge, attitude about organ donation Independent variables, age, sex, marital status, Religion and educational level.

Stratified random sampling technique was used to stratify medical students according to the year they are currently enrolled in. This was done by classifying the medical students by the year of study as follows. By using the formula, Sample size of the strata =  $\text{Sample size} / \text{Total population} * \text{Number of students in each strata}$ . A random sampling technique used within each strata using a selection frame and selecting samples randomly from the frame.

After thoroughly reviewing the relevant literature, a self-administered questionnaire was used for data collection. The questionnaires consisted of a total of

The questionnaire was handed over to the respondents in person and collected by the principal investigator. Ethical clearance was obtained from the institutional review board (IRB) of SPHMMC. Participants in the study were briefed about voluntary nature of the study and confidentiality issues. Informed written consent was obtained and the questionnaire was distributed and collected by the principal investigator. Then the data was checked for completeness and internal consistency. Then it was entered onto SPSS version 20 software package (IBM Corporation, Armonk, NY, USA). Random checking was done to verify the validity of the entered data.

Simple descriptive statistics including frequency and percentage were used to summarize the results, and chi-square and binary logistic regression were done to describe the association between variables.  $P < 0.05$  is considered as statistically significant association.

## RESULTS

A total of 240 questionnaires were administered and 236 were completed and received, (three of the respondents returned incomplete questionnaire, one was not willing to participate in the study), making the response rate 98.3%. The age of the study participants varied from 18 to 26 with a median age of 22 years. The mean ( $\pm$ SD) age was 21.64 ( $\pm$ 1.87) years.

The gender distribution consisted of 50.8 % female and 49.2% male. When we come to religion, 57.2% of the respondents were orthodox Christian, Protestant and Muslim constituted for 20.8 % and 16.9%, respectively, and others were 5.1%. Of 236 students that were included in the study, preclinical year students accounted for 83 (35.2%) and clinical year students for 153 (64.8%), of which a majority was

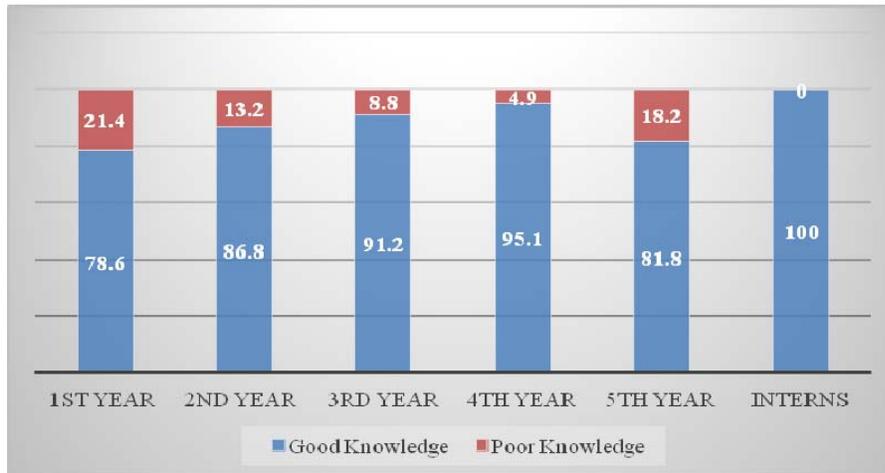
**Table 1:** Socio-demographic characteristics of the undergraduate medical students 18-26 years of age, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, May 2018.

Socio-demographic characteristics	Categories	Frequency (N=236)	Percent
Age	18-21	81	34.3
	22-26	155	65.7
Sex	Male	116	49.2
	Female	120	50.8
Religion	Orthodox	135	57.2
	Muslim	40	16.9
	Protestant	49	20.8
Educational level	Others	12	5.1
	1st year (Preclinical-1)	42	17.8
	2nd year (Preclinical-2)	41	17.4
	3rd year (Clinical-1)	34	14.4
	4th year ( new clinical 2)	41	17.4
	5th year ( old clinical 2)	44	18.6
	Intern	34	14.4

**Assessment of knowledge of medical students about organ donation**

Among 236 participants, a majority, 209 (88.6%), of the respondents had good knowledge. The mean ( $\pm$ SD) knowledge score was 10.67 ( $\pm$ 2.35). The minimum score was two and maximum was 16.

When we see the year wise distribution of their knowledge interns had the highest percentage of good knowledge (100%) followed by fourth- and third-year medical students, 95.1% and 91.2%, respectively (Figure 1).



**Figure 1:** Knowledge among of student about organ donation, St. Paul’s Hospital Millennium Medical College, Addis Ababa, Ethiopia, May 2018

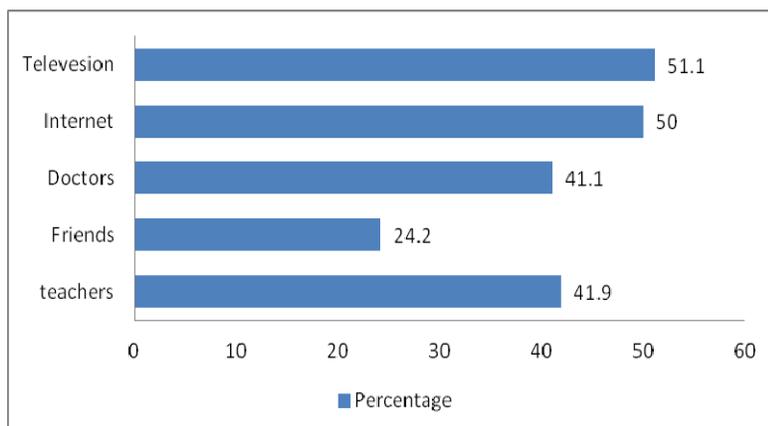
This research revealed that a majority, 232 (98.3%), of the study participants have heard of organ donation. When asked if they were aware that there was a law regarding transplantation of human organs 71.2% answered correctly. Most of the students were aware that brain dead organ donors had to be kept on ventilation support, 202 (85.6%) and, 161 (68.2%) knew brain dead patients can be organ donors.

them knew organ transplant recipients were more prone to developing cancer following transplantation.

A large majority of the participants had knowledge that donor’s and recipient blood group must be matched, 196 (83.1%), but only 102 (43.2%), knew human leukocyte antigen didn’t have to be matched. Nearly three-quarters, 176 (74.6%), of the students knew malignancy wasn’t always a contraindication to cadaveric organ donation, but only, 63 (26.7%), of

Two-thirds, 159 (67.4%), of them knew that hepatitis B patients couldn’t donate their solid organs and a similar percent, 158 (67.3%) knew transplant recipients were at increased risk for opportunistic infections. Knowledge about kidney donation was the highest (97%), followed by cornea (91.1%), liver (86%), heart (83%), lung (53%), skin (48%) and intestine (21%).

The sources of information among students at the College is given in Figure 1 and the knowledge of undergraduate medical students about organ donation is presented in Table 2.



**Figure 2:** Source of information of medical students, St. Paul’s Hospital Millennium Medical College, Addis Ababa, Ethiopia, May 2018.

**Table 2:** Knowledge of undergraduate medical students about organ donation, St. Paul Hospital's Millennium Medical College, Addis Ababa, Ethiopia, May 2018.

Variables	Categories	Frequencies (N)	Percentage (%)	
Have you heard of the term "Organ donation"?	Correct	232	98.3	
	Incorrect	4	1.7	
Have you heard of the term "Organ Transplantation?"	Correct	231	97.9	
	Incorrect	5	2.1	
Are you aware of "transplantation of human organ act"?	Correct	168	71.2	
	Incorrect	68	28.8	
Can a brain-dead patient's organs be donated?	Correct	161	68.2	
	Incorrect	75	31.8	
Which one of the following organs can be donated?	Heart	Correct	196	83.1
		Incorrect	40	16.9
	Kidney	Correct	229	97.0
		Incorrect	7	3.0
	Liver	Correct	203	86.0
		Incorrect	33	14.0
	Lung	Correct	126	53.4
		Incorrect	110	46.6
	Intestine	Correct	51	21.6
		Incorrect	185	78.4
	Skin	Correct	114	48.3
		Incorrect	122	51.7
	Cornea	Correct	215	91.1
		Incorrect	21	8.9
Will certified brain-death registered organ donor be immediately disconnected from ventilation support?	Correct	202	85.6	
	Incorrect	34	14.4	
Can parents/guardians make substitute decision making for mentally disable person in regard of organ donation?	Correct	83	35.2	
	Incorrect	153	83	
Donor's and recipient's blood group MUST be matched?	Correct	196	83.1	
	Incorrect	40	16.9	
Donor's human leukocytes antigen MUST be identical to that of the recipient for any organ transplantation?	Correct	102	43.2	
	Incorrect	134	56.8	
People of all ages can be potential donors?	Correct	58	24.6	
	Incorrect	178	75.4	
Hepatitis B and C carriers can donate all of their solid organs except the liver organ?	Correct	158	67.3	
	Incorrect	78	32.7	
Malignancy is always a contraindication of cadaveric organ donation?	Correct	176	74.6	
	Incorrect	60	25.4	
Increased risk of opportunistic infections is a common complication of all transplantation?	Correct	159	67.4	
	Incorrect	77	32.6	
Organ transplant recipients are more prone to developing cancer after transplantation?	Correct	63	26.7	
	Incorrect	173	73.3	

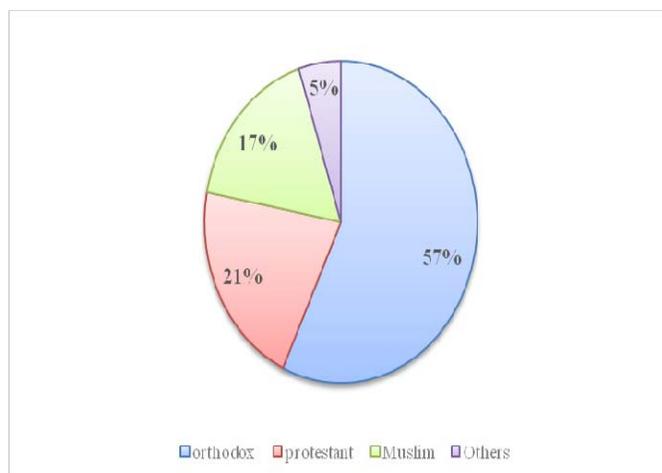
**Assessment of attitude among medical students about organ donation:** Coming to the attitude section, this study revealed that only, 24 (10.2%), of the participants had positive attitude. Among the participants of the study, 221 (93.6%), said they support organ donation and, 190 (80.5%), believed it adds meaning to one's life. 83.1% of them said they were comfortable thinking or talking about organ donation but only, 34 (14.4%), said their families agree with OD (Table 3).

Only, 91 (38.9%), responded they would agree to donate when they die although only, 6 (2.5%), believed their body should be kept intact after death. More than one-half, 137 (58.1%), believed there will be premature termination of medical treatment for registered organ donors and only, 8 (3.4%), thought cadaveric donation was better than live donation in solving shortage.

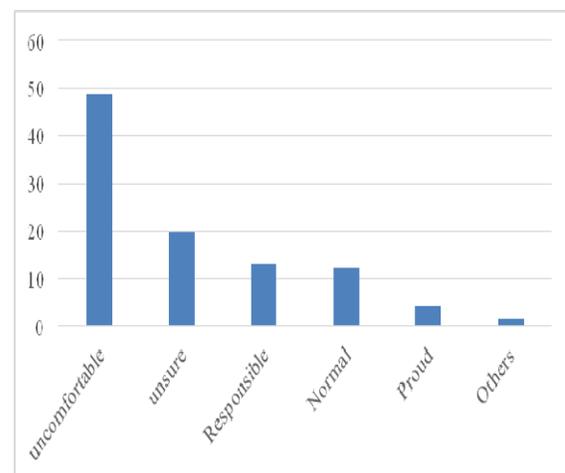
**Table 3:** Attitude of undergraduate medical students about organ donation, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, May 2018

Variables	Categories	Frequencies (N)	Percentage (%)
Do you support Organ donation?	Positive	221	93.6
	Negative	15	6.4
Do you feel comfortable to think or talk about Organ donation?	Positive	196	83.1
	Negative	40	16.9
Do you agree to donate your organs when you die?	Positive	91	38.9
	Negative	145	61.4
Does your family agree with organ donation?	Positive	34	14.4
	Negative	202	85.6
Do you think donating one's organ adds meaning to one's life?	Positive	190	80.5
	Negative	46	19.5
Do you have belief that your body should be kept intact after death?	Positive	230	97.5
	Negative	6	2.5
Do you believe your religion agrees with organ donation or transplantation?	Positive	80	33.9
	Negative	156	66.1
Do you have fear that your body will be disfigured, if you donate?	Positive	96	40.7
	Negative	140	59.3
Do you think there will be premature termination of medical treatment for registered organ donors?	Positive	99	41.9
	Negative	137	58.1
Do you think live organ donation is better than cadaveric organ donation in solving shortage?	Positive	8	3.4
	Negative	228	96.6

Only 80 (33.9%) believed their religion agreed with organ donation, of which majority were orthodox Christians (57.2%) followed by protestants (20.8%) and Muslims (16.9%).



**Figure 3:** Distribution of students by their beliefs in organ donation and religion, St. Paul Hospital's Millennium Medical College, Addis Ababa, Ethiopia, May 2018.



**Figure 4:** Students' feelings about asking families to donate organs of their deceased relatives, St. Paul Hospital's Millennium Medical College, Addis Ababa, Ethiopia, May 2018.

When the participants of the study were asked how they would feel if they were to ask families to donate organs of their diseased relatives majority answered uncomfortable followed by unsure and responsible.

**Association of independent variables with knowledge and attitude:** On bivariate analysis using chi-square and binary logistic regression on good knowledge and the independent variables (sex, educational level, source of information and religion), only two the of the independent variables were found to have significant association (Table 4).

Female students were five times more likely to be more knowledgeable than male students ( $P=0.001$ ,  $COR=5.383$ ,  $95\%CI$  1.963-14.758). Those who reported internet as their primary source of information were four times more knowledgeable than those who reported other outlets as their source ( $P=0.004$ ,  $COR=4.041$ ,  $95\%CI$  1.567-10.420). the clinical students were having 4 times better knowledge when adjusted for religion, sex and source of information ( $p=0.011$ ,  $AOR=4.09$  and  $95\% CI =1.37-12.19$ ).

**Table 4:** Multivariable regression analysis of knowledge on independent variables\* among undergraduate medical students, St. Paul Hospital's Millennium Medical College, Addis Ababa, Ethiopia, May 2018.

Variable	Category	P value	COR	95% CI	P value	AOR	95% CI
Sex	Male		1			1	
	Female	0.001	5.38	1.96 - 14.75	0.002	4.91	1.77 - 13.62
Internet	Yes	0.004	4.04	1.56 - 10.42	0.009	3.62	1.38 - 9.50
	No		1			1	
Education level	Clinical	0.058	0.458	0.20-1.02	0.011	4.09	1.37-12.19
	Preclinical		1			1	
Religion	Orthodox	0.907	1.136	0.133-9.717	0.454	2.50	0.23-27.43
	Protestant	0.559	.515	0.056-4.760	0.685	0.61	0.06 -6.59
	Muslim	0.347	.355	0.041-3.080	0.955	1.07	0.09 -12.21
	others		1			1	

## DISCUSSION

The results of this research reveal that majority of the respondents were knowledgeable (88.6%). which is comparable to a study done on knowledge and willingness to donate among health care workers in south west Nigeria which found that (82.5%) of the respondents had desirable knowledge (13), but it was found to be significantly higher than another African study done in Egypt which found only (36%) of the respondents had good knowledge (12).

This research shows that majority (98.3%) of the study participants have heard of organ donation. which was similar to a study done in Pune, India in 2016 which reported that from a total of 394 medical students' awareness regarding organ donation 98.7-100% (14).

This was also consistent with the result of a study done in Saudi Arabia which reported 90.9% knew what organ donation meant (15). Regarding the presence of a law about transplantation of human organs 71.2% answered correctly.

Which is much higher than the results of a study done in Karnataka , India which stated only 13.9% (6) but in a similar study done in Pune, India knowledge of already existing laws was found to be 57.6% (14). When we compare with an Africa study done in Egypt still the knowledge was much higher than what was found in the Egyptian study which was only 33.3% (12).

Some 68% of the participants knew brain dead patients can be organ donors, which was lower than a report from India (76.3%) who knew brain dead persons can be considered for OD (6).

This could be because of the fact that currently Ethiopia is only practicing live donation even though attempts are being made to start cadaveric donation. Knowledge about kidney donation was the highest (97%) and heart was (83%), finding which concur with the result of a study by Karnataka in India (97.7%) and (89.1%), respectively.

Among the participants in our study, 93.6% said they support organ donation and 80.5% believed it adds meaning to one's life. This is similar to the results of the study done in Kankarta, where a majority of the students (90.4%) supported OD and believed it was a gift to life, but only 38.9% of the respondents in this research said they would agree to donate when they die, a figure lower than 57.3% willingness to donate reported by . Our observation is also lower than a finding from Saudi Arabia (50.9%), who were willing to donate (15-17). In contrast, it was higher than the finding from a study in south-west Nigeria, which reported only 29.5% that were willing to donate when they die (14).

In this research we found that female students were more likely to have good knowledge about the topic and those who reported internet as their source of information had better knowledge scores. Thus, this could lead to the assumption that in order to address these issues the responsible party could use the media and especially the web as a primary outlet.

Only 33.9% of our students believed their religion agreed with organ donation, which contrasts both the Nigerian and Saudi Arabian studies that reported 63.4% and 91.3%, respectively, believed it was allowed in their religion to donate (12-15). This could also be the reason why majority of the respondents did not agree to donate when they die.

Overall only 10.2 % of our study subjects were found to have positive attitude towards OD, which is lower the study done in Nigeria (29.5%) and also from Egypt where 37% of the students had positive attitude (12,13). Despite having desirable or good knowledge the students in our college showed a negative attitude towards OD. This could be due of

### ***Strength and limitation***

In the design of the study, we tried to make the sample representative by using probabilistic sampling method. The participants were stratified according to their current year of enrollment and simple random sampling was used within each stratum. The data was collected from the participants directly to minimize data collector bias. That we did not pre-test the study questionnaire in a pilot to examine applicability and level of understanding and acceptance by the students was a limitation in our study.

### ***Conclusion***

In conclusion the study participants had good knowledge but the negative attitude towards organ donation. Female gender and having internet as their primary source of information were found to be significantly associated factors with good knowledge. Higher Education level was having better knowledge when adjusted to sex, religion and source of information. The students had a good understanding of facts that pertain to organ donation and transplantation but had a negative attitude towards it. It is crucial that the college and clinical departments that practice transplantation medicine (department of surgery and internal medicine) involve in the theoretical teaching as well as devising a curriculum that allows students to raise and eliminate their perceived barriers to organ donation and transplantation.

## **ACKNOWLEDGMENT**

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### **Competing Interest:**

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