



St. Paul's Hospital Millennium Medical College

Department of Internal Medicine

**Knowledge Attitude and Willingness towards Kidney Donation among
Residents of Addis Ababa, Ethiopia: A Cross Sectional Study**

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Addis Ababa, Ethiopia

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List of Acronyms

AOR – Adjusted Odds Ratio

CI – Confidence interval

CKD – Chronic kidney disease

DC – Data collectors

ESKD – End stage kidney disease

HIV – Human immunodeficiency virus

OR – Odd ratio

PI – Principal investigator

SPHMMC – St. Paul’s Hospital millennium Medical College

SPSS – Statistical Package of Social Sciences

UK – United Kingdom

USA – United States of America

Abstract

Background: End Stage Kidney Disease is a growing problem worldwide. The preferred treatment option for ESKD is kidney transplantation. But there is a great discrepancy between the number of donors and recipients all around the world. Donor shortage limits transplant practice and leads to increased mortality, worse quality of life and increased healthcare expenditure. Studies assessing the public's state of mind regarding kidney donation are required to address this problem.

Objectives: To assess the level of knowledge, attitude and willingness towards kidney donation in residents of Addis Ababa city, Ethiopia.

Methods: A community based analytical cross sectional study was done among residents of Addis Ababa city, Ethiopia, between January and March of 2024. Data was collected through a semi-structured questionnaire and analysed by statistical package for social sciences (SPSS) version 27. Descriptive statistics like frequency, percentage and mean with standard deviation was used to present results while association was assessed by using Pearson chi square test and multinomial logistic regression. P value of < 0.05 was considered statistically significant.

Results: It found that knowledge was poor in 358 (84%) and good in 68 (16%) of the participants. Attitude was favorable in 330 (77.5%) and unfavorable in 96 (22.5%) of the participants. Regarding willingness to be a live kidney donor to a relative, 265 (62.2%) said that they were willing, 29 (6.8%) of the respondents answered "No" while 132 (31%) were undecided. On willingness to be a deceased kidney donor, 220 (51.6%) were willing, 50 responded they were not willing and 156 (36.6%) were not sure. The most common reasons given for lack of willingness was: I have not thought about it; My family may not want me to; My religion forbids it; I am worried it would be sold and fear of future kidney disease. In the tests of association, two factors were found to have association with willingness; having previously donated a tissue or an organ and attitude.

Conclusion: The study found a comparatively low level of knowledge but high favourable attitude. There was good level of willingness especially towards live donation to a relative. Interventions addressing knowledge levels and eliminating barriers towards willingness need to be designed and implemented.

1. Introduction

1.1 Background

Chronic kidney disease (CKD) is defined as abnormalities of kidney structure or function, present for >3 months, with implications for health. It is marked by long standing kidney damage that persists irrespective of the cause. It is progressive in nature and if given enough time, results in kidney failure leading to significant morbidity and mortality. This final state, known as end stage kidney disease (ESKD), is marked by irreversible decline in kidney function and necessitation of renal replacement therapy for the prolongation of life and alleviation of sickness (1).

The treatment options of ESKD are twofold. One is dialysis, while the other is kidney transplantation. Dialysis refers to the process of artificial removal of waste and excess fluid from the body when the kidneys fail (2). Kidney transplantation on the other hand is the surgical placement of a kidney taken from the donor into the patient whose kidneys has failed (3). Comparatively, transplantation is the preferred treatment modality. It is seen to have better survival, decreased cardiovascular events and significantly improved quality of life. All these benefits also persist and even increase with time after transplant. As such it is the recommended means of treating patients with ESKD (4, 5).

The first human kidney transplant occurred in 1954, in Boston, in twins. Since then the transplantation process has evolved significantly in terms of patient selection, technique and post-operative immunosuppressive management, all of which have improved its outcome (6). Donors now can be live donors or deceased donors. The live donors can be related or unrelated to the recipient while a deceased donor can be either a donor after brain death or a donor after cardiac death. Outcomes are presumed to be better with live donors but recent studies have shown comparable graft survival and general outcome in both cases. The only exception to these findings is delayed functioning of the grafted kidneys after implantation from deceased donors (7).

Kidney transplantation is indicated in patients with kidney failure who are fit to undergo surgery. Most patients with ESKD have much comorbidity. Some are caused by the renal failure itself while others have it caused by the underlying illness that lead to the renal failure. In some it

might be completely unrelated. Nevertheless, the patients are subjected to a battery of tests in order to identify possible illnesses and risk factors that might make the patient ineligible. Some possible contraindications that might be identified include, but are not limited, to active malignancy, active infection, active drug abuse, uncontrolled psychiatric disease, morbid obesity and severe cardiac or pulmonary diseases that make the patient unfit for surgery. The patient should also be deemed capable of compliance to the daily medication regimen as immunosuppressive are going to be prescribed lifelong after the surgery (3, 8).

From the donor's perspective, there are also tight criteria for eligibility. Donors should be between the ages of 18 and 60 and have adequate kidney function. Active malignancy, Human immunodeficiency virus (HIV) infection, pelvic or horseshoe kidneys, morbid obesity and psychiatric disorders are some contraindications that prohibit donation. During the procedure, there is a small but real risk associated with surgery. Survival after donation is unaffected in almost all studies while the chances of development of ESKD seem to be slightly higher than healthy matched controls but similar with the general population. Psychological studies on kidney donors have demonstrated positive emotional experiences after their act of altruism (3, 9).

In the Ethiopian setting, the first solid organ transplantation, of the kidneys, was done in September 2015 in the only transplant center in St. Paul's Hospital Millennium Medical College (SPHMMC) (10). Since then 145 transplants were done but the service was interrupted by the global COVID-19 pandemic in 2020 (11). The surgical as well as graft outcomes from the first batch of surgeries were comparable to other setups with extensive experience (12, 13). Quality of life was shown to be good with transplant while cost effectiveness was demonstrated when transplant was compared to dialysis in Ethiopian setting (14, 15). Legally, current Ethiopian law allows only for living related donations but plans to start deceased donations have been well underway by the federal ministry of health with efforts since 2017 (10,16).

1.2 Statement of the problem

There is an increased need for kidney transplants worldwide, a fact that is clearly demonstrated by the growing burden of CKD and ESKD. The number of people with CKD has reached an estimate of more than 800 million affecting greater than 10% of the global population. This figure has grown from past decades and is expected to raise further affecting 14-16% of people

by 2030. As a corollary the number of people with ESKD has increased as well. It is estimated that ESKD affects greater than 0.1% of people worldwide (17, 18, and 19).

Due to this, the number of people requiring transplant in the world has risen. But the number of transplantations done does have not come close to matching it. Conservative estimates from 2010 suggested that 4.9 million people worldwide required renal replacement therapy. About half of them, 2.6 million people, received dialysis, while only 568,000 had kidney transplantation (20).

Every year the number of transplants done was lower than the number of new patients requiring transplants. In the year 2021 for example, only 92,532 people received kidney transplants worldwide (21). This figure despite being the highest number ever recorded represented less than 10% of actual needs. Recent data from countries with transplant waiting lists demonstrates this reality even clearly. In the United States, 88,763 people are waiting for a kidney transplant as of February 2023, of which 42,232 of them were new additions during 2022. Contrastingly, only 25,499 kidney transplants performed in the same calendar year (22). Data from other countries that have registries also paint a similarly bleak picture (23). The primary driver of this imbalance is lack of live or deceased organ donors for which mitigating efforts are being promoted globally.

This mismatch is more pronounced in the developing world. Only about 10% of the patients in low and middle income countries receive renal replacement therapy (19, 20). Majority of them are on dialysis as the capabilities for transplant are limited if at all available. Transplant services are reported to be active in only 23% of low income countries, even then serving large swathes of population. None had transplant registries (24). In some of these developing countries that do have transplantation setup, organ shortage is an even bigger problem as a number of other factors further compound the procurement process. Besides the obvious financial constraints, political, cultural and legal issues impede organ donation and worsen the need.

In Ethiopia, data regarding the number of people requiring transplant is scarce. There is also no transplant waiting list. So, one is left to infer the need for transplant indirectly. One such indicator would be the prevalence of CKD and ESKD. According to recent data, prevalence of CKD is estimated at 4.9% (19). There is a dearth of literature on ESKD but hospital based studies in patients with chronic illness found the pooled prevalence of ESKD is found to be 0.4% (25). Despite this large burden, renal replacement therapy in the form of both dialysis and

Kidney transplant is limited. Only 1,132 patients were on maintenance haemodialysis in 2022, while only 145 patients had transplant done in the country (11). Even though more patients have had transplants done abroad, few can afford to go abroad and have transplant done.

The lack of donors and the consequent lack of transplantations lead to a myriad of drawbacks. Patients suffer increased cost and experience worsened quality of life on dialysis while being subject to further dialysis related complications. Morbidity and mortality are demonstrably worse for these patients. Some become ineligible for transplant while on waiting for it. Others have reduced outcomes when they do gain transplants due to increased waiting time. National health care expenditures are increased while its economic impacts are also sizeable (5, 19). So, further inquiries exploring the state of donors and factors that affect it are needed to assess and address this problem.

What determines the willingness to be a live or deceased kidney donor to a relative and a stranger has been studied. The knowledge, attitude and practice (KAP) model has been one of the methods that has been employed many times to study the issue, albeit with some modification. In this model, descriptive data regarding the level of the willingness to be a donor is obtained. Furthermore, the level of knowledge and attitude are assessed. Finally the possible association and its degree as assessed inferentially. The different studies that assessed this have found varying results of willingness, knowledge and attitude. The effect knowledge and attitude have on willingness has also differed even though attitude seems to be the more consistently associated (26, 27, 28, 29, 30, 31, 32 and 33).

1.3 Rationale of the study

Transplantation is the preferred means of treatment for the growing ESKD population. In setups where transplantation is done, the rate limiting step in the process is the number of kidneys available. As far as the author's knowledge goes, there are no studies in the Ethiopian context directly investigating the level of willingness towards kidney donation among the general public. This study aims to do just that. It also aims to assess the level of knowledge and attitude and how they might relate to levels of willingness. The findings of this research will help establish what understanding there is about being a kidney donor and point out possible factors that might affect it. This will serve as an input to public leaders and policy makers in designing interventions that

improve donation rates through their policies and information campaigns. The study will also serve as back ground information and guide further research on the topic.

2. Literature Review

Given the discrepancy in the demand and supply for kidney transplantation, the reasons for non-donation had been studied exhaustively worldwide. The knowledge, attitude and willingness for kidney transplantation were studied among several target population groups including health care workers and medical students in an effort to determine the reasons behind the low rate of kidney donation with a consequent intent of creating a strategic plan to address these factors.

2.1 Knowledge

Assessment of knowledge in several studies done worldwide varies, with different sub-populations having different levels of knowledge.

The level of knowledge varied significantly in different studies. In a cross sectional study done in Malaysia, mean knowledge score was reported to be low, whereas, a similar study done in Karnataka, India assessing knowledge on kidney donation 76% of the respondents had good knowledge (26, 27).

In developed countries, there is a disproportionate shortage of organs for transplantation in ethnic minorities compared with other ethnicities. In a study done in United Kingdom (UK), 83% of the participants knew that you can leave your kidneys for transplants after death and there seems to be no difference among ethnic groups. The study also showed a persistently negative attitude among ethnic minorities and that increased knowledge doesn't equate with changes in attitudes or behaviours (30, 31).

Looking at African studies, advanced deceased organ transplantation currently takes place only in South Africa. Most African studies show a low level of knowledge on kidney donation. Knowledge towards kidney donation was low in a study done in clients visiting a health care center in urban province in South Africa (32). A study conducted in Nigeria on health care workers also showed that only 63.9% responded correctly to the knowledge questions. 51% of students in a study conducted in a Rwanda University reported a low level of knowledge. (33, 34)

Ethiopian researches done on knowledge, attitude and practice of organ donation are few with two of the three studies having been done on university students and another cross sectional

study on patient companions. The studies done on medical students in SPHMMC and health science students in Jimma University both show a high level of knowledge among participants (35, 36).

In the study done in SPHMMC, Being female and using the internet as a primary source of information were associated with having a good knowledge. Females were 5 times more likely to be more knowledgeable than male students. The study done in Jimma University didn't show a difference in the level of knowledge based on gender. Rather, being a student of dental medicine and medicine were associated with being more knowledgeable. Knowledge also increased with increasing year of study in the university (35, 36).

Another study conducted in the only transplant center in Ethiopia, SPHMMC, regarding knowledge and attitude of patient companions on organ donation, showed poor level of knowledge. Contrary to the study done on medical students in the same institution, male companions were two times more likely to be knowledgeable than females (37).

The effect of knowledge on willingness to donate was different in different studies. Some studies showed that increasing level of knowledge is not associated with an increase in willingness and tendency for kidney donation while others did. This was the case with both Asian studies mentioned above which showed that increasing knowledge was not significantly associated with increased willingness to donate (26, 27). In contrast, differing results were seen in a study in Iran which found knowledge to be the strongest predictor of performance. Performance was defined in this study as having received or donated an organ or having an organ donation card (28).

Even within the same study, knowledge had different impact among sub-populations. In a study done in Jeddah, Saudi Arabia, the effect of knowledge was different among different subgroups of population. Knowledge was significantly associated with willingness for kidney donation in students than in public whose willingness depended more on positive attitude (29).

2.2 Attitude

The attitude towards kidney donation and factors determining it also vary greatly across the globe and within nations. The attitude towards kidney donation among different ethnicities and

cultural views, religions, education and economic strata has been demonstrated with variable results. (26, 27, 30, 38)

Attitude towards living kidney donation from workers in units related to organ donation in Spain, Mexico and Cuba showed that in these centers, 90% of the study participants to have had a favourable attitude towards deceased and related live kidney donation. These involved participants, who were both healthcare and non-healthcare personnel, had a drop in attitude when unrelated live kidney donation was considered, Their attitude levels decreased significantly to only 28% of the participants having a favourable attitude overall (38).

In the researches done on medical students of Ethiopia in SPHMMC and Jimma university reported poor attitude despite a good level of knowledge of the students. In the SPHMMC study, only 38.9% of the respondents agreed to donate their organs when they die and 33.9% of the respondents only believed their religion allows organ donation, of which most were Orthodox Christian (35, 36). In the other study done in the same institution on patient attendants, favourable attitude was associated with using more than one source of information and having a higher education level (37).

Several researches showed that the reason behind a negative attitude towards donation are associated with poor trust on the health care system and fear of using ones organs for other reasons like, medical research (30). Other reasons for negative attitude include, the tendency to want to die with a “full body” in a research done in South Africa and deceased donation being considered a dishonour to the dead in a Tanzanian study (32, 39).

2.3 Willingness

In developed countries like the United States of America (USA) and UK, the waiting list for transplantation is high. Several researches in the US done in recent years focus on factors affecting willingness for kidney donation as the national data have shown that live kidney donations are obtained from biological relatives in 69% of the cases. This is especially the case among ethnic minorities. Studies have been conducted to assess whether this load is due to a higher burden of disease resulting in either higher patient load or higher number of candidates who can't donate because of ineligibility or if it is due to poor willingness of ethnic minorities to donate their kidney (30). One such study found that African Americans were significantly less

likely to give live donations to relatives when compared with Hispanics and whites. The study found that concerns about burial, socioeconomic factors and trust on the medical system explained the differences observed (31).

In two studies done in two African countries, on awareness and attitude of organ donation among healthcare professionals: A study done in Kenya showed that majority of the respondents were not willing to sign up to be donors when deceased with only 39.5% being willing to sign up to be deceased donors. The same study showed that caregivers were less likely to be donors than healthcare providers, 34.8% versus 48.7%. In a similar study in three tertiary institutions in Southern Nigeria, only 29.5% were willing to be donors (40, 41).

Another study conducted on nursing students in Rwanda, showed that the 36.9% of the respondents stated that the most important factor they consider to donate an organ in case of need is that the participant is a family member. The study didn't find an association between attitude and perceptions with regards to organ donation (33).

Knowledge and attitude seem to have different effect on willingness to donate. In a Malaysian study, ethnicity and attitude on kidney donation scores were predictive of willingness to donate. While, in study done in Iran, on performance of kidney donation on nurses from different wards, knowledge was the strongest predictor for the nurses' performances. Having a donation card was also associated with a good performance of having donated or received an organ (26, 28).

The studies done in Ethiopia focused on assessing the knowledge and attitude of participants towards organ donation. Practice and willingness haven't been studied widely (35, 36, 37).

3. Objectives of the Study

3.1. General Objective:

- To assess the level of knowledge, attitude and willingness towards kidney donation in residents of Addis Ababa city, Ethiopia.

3.2. Specific Objectives:

- To determine the level of knowledge about kidney donation
- To describe the level of attitude about kidney donation
- To determine the public's willingness to be donate kidney
- To identify the factors that are associated with knowledge, attitude and willingness to donate

4. Methods and Materials

4.1 Study Area

Ethiopia, officially known as Federal Democratic Republic of Ethiopia, is a country located in the horn of Africa. It is the second most populous country in Africa and the largest landlocked country in the world, having a recently estimated population of more than 105 million people, according to its National Statistics Services (42).

Addis Ababa is the capital and largest city of the country. According to the same source it is 526.9 square kilometres wide and houses 3.85 million people with making it one of the most densely populated areas in the country. It has eleven sub cities. It serves as Ethiopia's political, educational and administrative centre. Addis Ababa is also the hub of the nation's transportation network and channels most of the country's trade activity. Health infrastructure and services are most developed in this capital (42).

4.2 Study Period

The study was conducted between March 2023 and April 2023.

4.3 Study Design

For this study, a community based analytical cross sectional study design was employed.

4.4 Population

4.4.1 Source Population

The source population for this study were the residents of Addis Ababa city, Ethiopia.

4.4.2 Study Population

All persons living in Addis Ababa during the study period fulfilling the inclusion criteria formed the study populations

4.5 Eligibility Criteria

4.5.1 Inclusion Criteria

- Age greater than 18 years

- A citizen of Ethiopia
- Carries evidence of being a resident of Addis Ababa

4.5.2 Exclusion Criteria

- A person who has donated a kidney before

4.6 Sample size determination and Sampling technique

4.6.1 Sample size determination

Sample size was determined using the following formula

$$n' = \frac{n}{1 + \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2 N}}$$

n' – Adjusted sample size

n – Sample size

N – Population size, which is 3,850,000

P – Estimated proportion

Z – Level of confidence, which is 95%.

E – Margin of error; which is 5%.

Table 1 – Sample size calculation based on different specific objectives for Knowledge Attitude and Willingness towards Kidney Donation among Residents of Addis Ababa, Ethiopia: A Cross Sectional Study

Specific Objective	Proportion	Sample size	Sample size with 10% contingency
Knowledge	10.6% ⁽³⁷⁾	146	161
Attitude	52.9% ⁽³⁷⁾	383	422
Willingness	34.8% ⁽⁴⁰⁾	349	384
Undetermined	50%	385	424

After comparing each sample size value the maximum sample size was found with P valued at 50%, so that was taken. Including the 10% contingency, the final calculated sample size was 424.

4.6.2 Sampling technique

Samples were selected by convenience sampling method.

4.7 Study Variables

4.7.1 Dependent Variables

- Willingness

4.7.2 Independent Variables

- Age
- Sex
- Occupation
- Religion
- Marital status
- Level of education
- Knowledge
- Attitude

4.8 Operational definitions

Knowledge: knowledge refers to the cumulative sum body of facts, information and skills acquired through time. In this study, knowledge refers to the cumulated understanding on one has regarding kidney donation. Operationally, participants that score 5 or above from the 7 knowledge questions were regarded as having good knowledge.

Attitude: Attitude is broadly defined as an enduring predisposition or the tendency to behave in a certain manner. It also refers to the mind-set one has regarding a subject, thing or person. In this study, attitude refers to the individual's predisposition towards kidney donation. Participants that have a sum score of 31 or above on the 8 attitude questions were regarded as having favourable attitude.

Willingness: Willingness refers to the state of preparedness to act. Willingness in this study refers to one's readiness to donate a kidney alive or after being declared deceased. Willingness was assessed by a yes, no or not sure question.

4.9 Data collection

Data was collected by a semi-structured questionnaire administered by trained interviewers. The questionnaire was developed by the primary investigator from the reviewed literature (26, 29, 32, 36). It was revised by supervisors for validity and the comments were incorporated into the final questionnaire. It was translated to the local language Amharic for ease of administration (See Annex 1 and 2).

The questionnaire comprised of five portions. The first part pertained to the socio-demographic characteristics. The second part was about general inquiry and assessed general knowledge and sources of information. The third part was on knowledge, the fourth on attitude and the fifth on willingness. It will contain a total of 23 questions. 5 questions were for general information. There were 7 knowledge questions. Each had a true/false/I don't know options for response. A correct answer was given 1 point while a wrong/I don't know was given 0 points. The total was summed up and graded according to the operational definition. The Attitude portion of the questionnaire had 8 questions, the answers of which was on a five point Likert scale ranging from strongly disagree to strongly agree. The answers were given a score ranging from 1 to 5, 1 being strongly disagree and 5 being strongly agree. 4 questions were scored in reverse. The minimum score will be 8 while maximum will be 40. The scores were summed and categorized based on the operational definition. Willingness was assessed by yes/no/not sure questions.

Thirteen data collectors were hired to assist in the data collection. They were initially trained by the primary investigator on the questionnaire and overall data collection. Data was collected by trained investigators and the primary investigator in areas of the city with population traffic selected based on convenience.

4.10 Data Processing and Analysis

After data was collected it was checked for completeness by the primary investigator (PI). It was then cleaned, coded and entered and analysed with Statistical Package of Social Sciences (SPSS) for Windows version 27.0. Categorical data was analysed as frequencies with

percentages and continuous data were analysed as means with standard deviations. Associations were checked by Pearson's chi square test and a P value < 0.05 was considered statistically significant. Multinomial logistic regression was used to calculate odd ratios (OR) with 95% confidence interval (CI) for those variables found to be associated. Results are presented by making use of charts, tables and in plain text.

4.11 Ethical Consideration

Written informed consent was taken from participants before data collection. Afterwards, the data collected was coded and treated with confidentiality. It is stored under lock and key under direct supervision of the primary investigators. The information gathered was used only for the purposes of the study.

4.12 Dissemination of results

The results of this study will be first presented to the departments of internal medicine and public health as part of the thesis defence. It will be submitted to responsible stakeholders including the national transplant center and Federal ministry of health. Presentations will be made, if possible, in appropriate seminars and conferences. Attempts will be made to publish the findings of this study in relevant local and international scientific journals.

5. Results

A total of 440 responses were obtained, of which 16 were excluded due to incompleteness of data. The final number of respondents included being 426.

5.1 Socio-demographic characteristics

From the 426 cases, majority of the respondents were in the age groups 18 to 25 (152, 35.7%) and 26 to 35 (182, 42.7%). The remaining age groups together accounted for 21.6% (See table 2). The minimum age of the respondents was 18 while the maximum was 65. The mean age of respondents was 31.2 ± 10.3 years.

The respondents were closely matched in terms of sex, with 206 males representing 48.4% and 220 females representing 51.6%. Most (62.2%) were followers of Orthodox Christianity, while 23.8% and 9.2% belonged to Muslim and Protestant religions, respectively. The remaining 4.9% was accounted for by catholic and Jehovah witness participants and those that did not identify with any religion. 298 (70%) of the participants were single and 122 (28.6%) were married.

Regarding level of education, 245 (57.5%) had a first degree while 88 (20.7) had a masters' degree. 30 (7%) of them had a primary education while 57 (13.4) of them had a secondary education. In terms of occupation, 216 (50.7%) said they were self or privately employed, 90 (21.1%) were government employed and 82 (19.2%) were students. 38 (8.9%) were unemployed.

Table 2 – Socio-demographic results, n=426

Variable	Frequency	Percent
Age		
18 – 25	152	35.7
26 – 35	182	42.7
36 – 45	44	10.3
46 – 55	26	6.1
56 – 65	22	5.2
Sex		
Male	206	48.4
Female	220	51.6
Religion		
Orthodox	350	62.2

	Muslim	16	23.8
	Protestant	39	9.2
	Catholic	2	.5
	Jehovah Witness	4	.9
	None	15	3.5
Marital Status			
	Single	298	70.0
	Married	122	28.6
	Divorced	4	.9
	Widowed/Widower	2	.5
Level of Education			
	Can read and write	2	.5
	Primary education	30	7.0
	Secondary education	57	13.4
	First degree	245	57.5
	Master's Degree	88	20.7
	PhD	4	.9
Occupation			
	Student	82	19.2
	Self/private employed	216	50.7
	Government employee	90	21.1
	Unemployed	38	8.9

Abbreviations; PhD: Doctor of Philosophy.

5.2 General Inquiry

From the 426 participants, 402 (94.4%) of them had heard of kidney donation (See table 3). Their sources of information in those that had had heard about kidney donation were frequently multiple, 82% of them having heard about kidney donation from 2 or more sources. Television (288, 71.6%) and internet sources (229, 57%) were the most common sources. (See figure 1).

The participants had a relative or a friend with kidney disease in 109 (25.6%) of the responses. They also had a friend or a relative who had donated a kidney in 41 (9.6%) of the responses. 140 (32.9%) of the respondents had practiced tissue or organ donation, all of which were blood donations. There were no other donations practiced.

Table 3 – General Inquiry results, n=426, May, 2024 1

Question		Frequency	Percent
Have you ever heard of kidney donation?			
	Yes	402	94.4
	No	24	5.6
Do you have a relative or a friend with kidney disease?			
	Yes	109	25.6
	No	317	74.4
Do you have a relative or a friend who has donated a kidney?			
	Yes	41	9.6
	No	385	90.4
Have you ever donated a tissue or organ?			
	Yes	140	32.9
	No	286	67.1
If so, please specify (can choose more than one)*			
	Blood	140	100**
	Other	0	0%**

* There were no multiple responses given to this question even though it was possible.

** Percentage calculated out of those who responded “yes” to having ever donated a tissue or an organ.

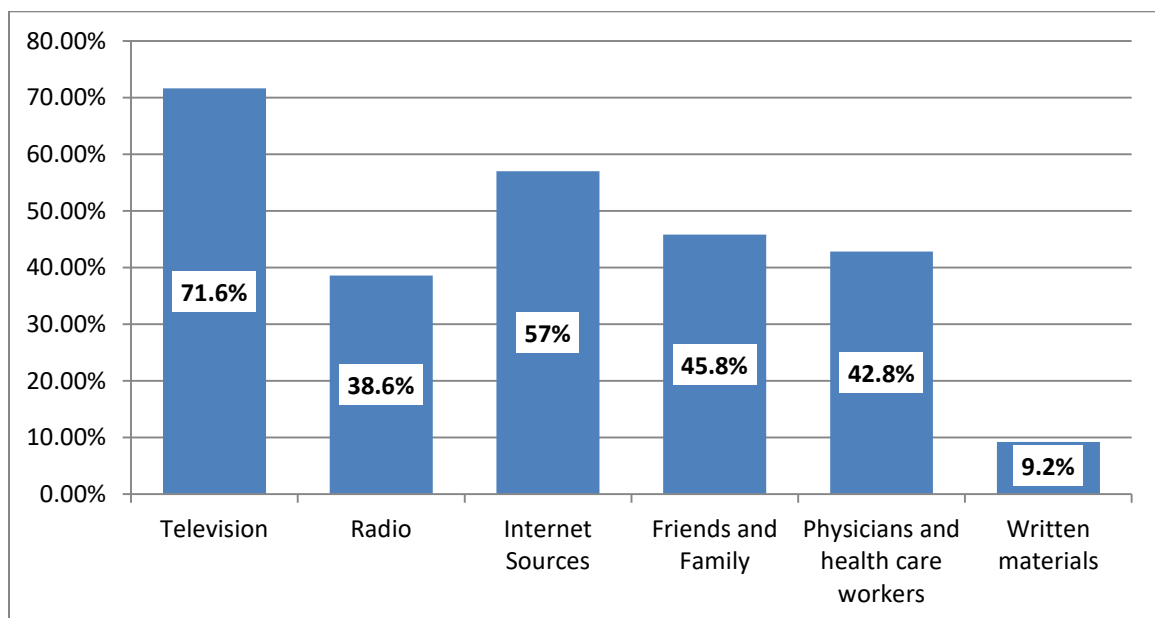


Figure 1 – Sources of information about kidney donation, n =402, May 2024

5.3 Knowledge

Knowledge was found to be poor in 358 (84%) and good in 68 (16%) of the participants. As shown in table 4, a high proportion of respondents (350, 82.2%) knew a person can live a normal life with one kidney after donation. Two thirds (267, 62.7%) knew a kidney can be donated while alive or after death. 238 (55.9%) rightly said dialysis was an inferior treatment choice compared to kidney transplant. Only 89 (20.9%) were aware of the lifelong medications that would need to be taken after kidney transplantation. A significant majority (261 respondents, 61.3%) had wrongly answered that people could never donate if they were older than 60, had malignancy, HIV or Hepatitis virus infection. A similarly high proportion of respondents (260, 61%) incorrectly thought similar blood groups were required between donor and recipient for transplant to occur. 275 (64.5%) respondents were aware of the availability of kidney transplantation in Ethiopia.

Table 4 – Knowledge results, n=426, May, 2024

Question	Frequency	Percent
For a person with kidney failure dialysis is better than kidney transplant		
True	95	22.3
False	238	55.9
I don't know	93	21.8
A kidney donor can live a normal life on one kidney		
True	350	82.2
False	20	4.7
I don't know	56	13.1
A kidney can be donated while alive or after death		
True	267	62.7
False	47	11.0
I don't know	112	26.3
People older than 60, People with malignancy, HIV, or hepatitis virus can never donate a kidney		
True	261	61.3
False	37	8.7
I don't know	128	30.0

The donor and recipient must have the same blood group for kidney donation			
	True	260	61.0
	False	29	6.8
	I don't know	137	32.2
After transplant the recipient must take medications for the rest of his/her life			
	True	89	20.9
	False	125	29.3
	I don't know	212	49.8
Kidney transplantation is done in Ethiopia			
	True	275	64.6
	False	44	10.3
	I don't know	107	25.1

Abbreviations; HIV: Human Immunodeficiency Virus.

5.4 Attitude

Attitude was found to be favourable in 330 (77.5%) and unfavourable in 96 (22.5%) of the participants.

As shown in table 5, 388 (91.1%) respondents believed kidney donation is a good thing while 355 (83.3%) strongly agreed kidney donation can save someone's life. 331 (77.7%) disagreed with the statement kidney donation is against the will of God. 361 (84.7%) of the participants disagreed with kidney donation dishonouring the dead body and 392 (92%) disagreed with a kidney donation disturbing the spirit of the dead person. The respondents were split on whether they believed a kidney donor has increased risk afterwards. 244 (57.3%) disagreed with this statement while 174 (40.8%) believed in it having increased risk. The statement about a donor having a normal life span is favoured by 356 (81.2%) of the respondents and 304 (71.4%) respondents agreed the dead don't need any kidneys.

Table 5 – Attitude results, n=426, May, 2024

Question	Frequency	Percent
Kidney donation is a good thing		
Strongly Disagree	20	4.7
Disagree	15	3.5

	Neutral	3	.7
	Agree	185	43.4
	Strongly Agree	203	47.7
Kidney donation can save someone's life			
	Strongly Disagree	12	2.8
	Disagree	2	.5
	Neutral	2	.5
	Agree	55	12.9
	Strongly Agree	355	83.3
Kidney donation is against the will of GOD			
	Strongly Disagree	162	38.0
	Disagree	169	39.7
	Neutral	53	12.4
	Agree	2	.5
	Strongly Agree	40	9.4
Kidney donation is dishonoring the dead body			
	Strongly Disagree	162	38.0
	Disagree	199	46.7
	Neutral	46	10.8
	Agree	2	.5
	Strongly Agree	17	4
Kidney donation disturbs the spirit of the dead person			
	Strongly Disagree	205	48.1
	Disagree	187	43.9
	Neutral	17	4
	Agree	3	.7
	Strongly Agree	14	3.3
Kidney donors are at high risk of kidney disease			
	Strongly Disagree	83	19.5
	Disagree	161	37.8
	Neutral	8	1.8
	Agree	160	37.5
	Strongly Agree	14	3.3
Kidney donors have the same lifespan as other people			
	Strongly Disagree	15	3.5
	Disagree	64	15.0

	Neutral	1	.2
	Agree	208	48.8
	Strongly Agree	138	32.4
The dead do not need any kidneys			
	Strongly Disagree	43	10.1
	Disagree	75	17.6
	Neutral	4	.9
	Agree	94	22.1
	Strongly Agree	210	49.3

5.5 Willingness

Willingness to donate a kidney was assessed in two categories; Willingness to donate to a relative while alive and willingness to be a deceased donor.

Of the 426 respondents, 265 (62.2%) said that they were willing to be a live kidney donor to a relative. 29 (6.8%) of the respondents answered “No” while 132 (31%) were undecided (Figure 2). The most common reason given for lack of willingness was that they have not thought about it (16.4%). Similar proportion of the respondent cited family, religion and possible illnesses and fear of future kidney disease as prohibiting factors. Thoughts of need for reserve kidney and risk of surgery were the least mentioned reasons for not donating a kidney (See figure 3).

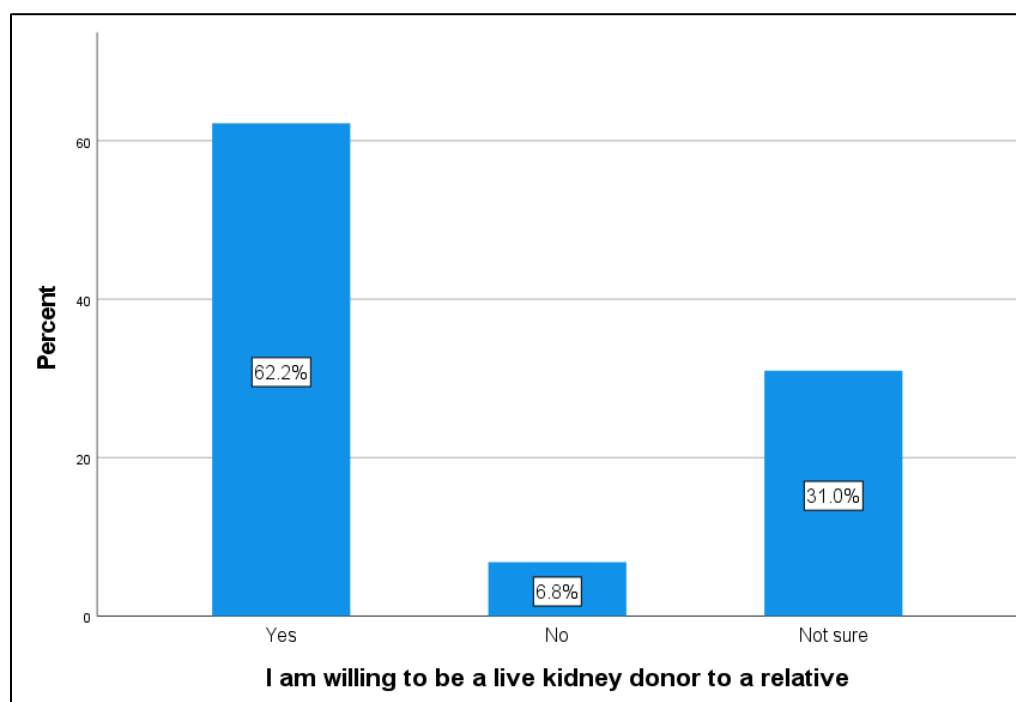


Figure 2 – Willingness to be a live kidney donor to a relative, no=426, May 2024

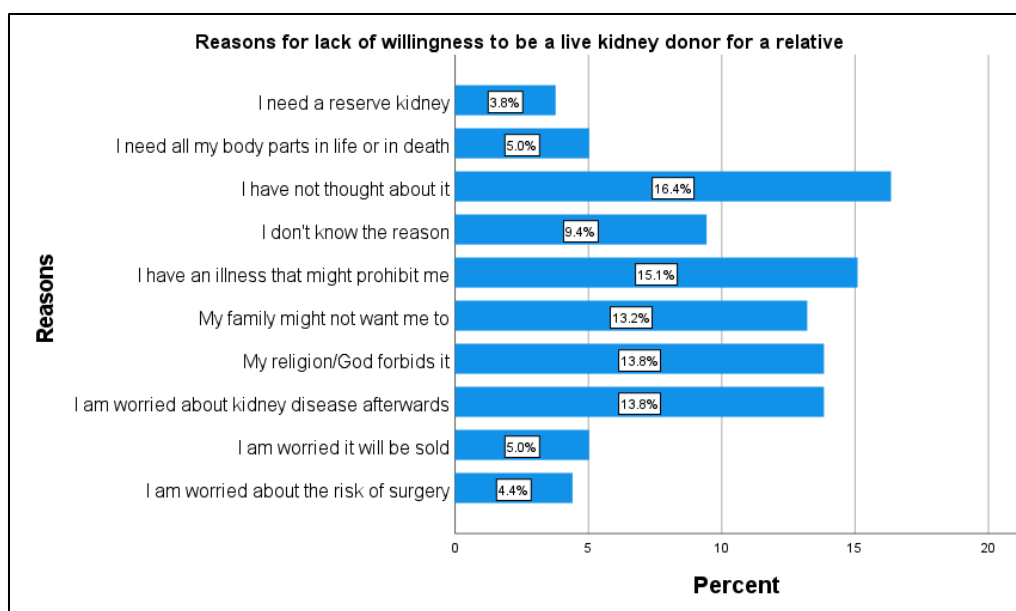


Figure 3 – Reasons for lack of willingness to be a live kidney donor, n=161, May 2024

Of the 426 respondents, 220 (51.6%) were willing to be a deceased kidney donor. 50 responded they were not willing to be a donor and 156 (36.6%) were not sure (See figure 4). The most common reasons given include: having not thought about it, worrying it would be sold, family and religion forbids it. The least cited reasons include not wanting ones' body to be disturbed and thinking one is too young (Figure 5).

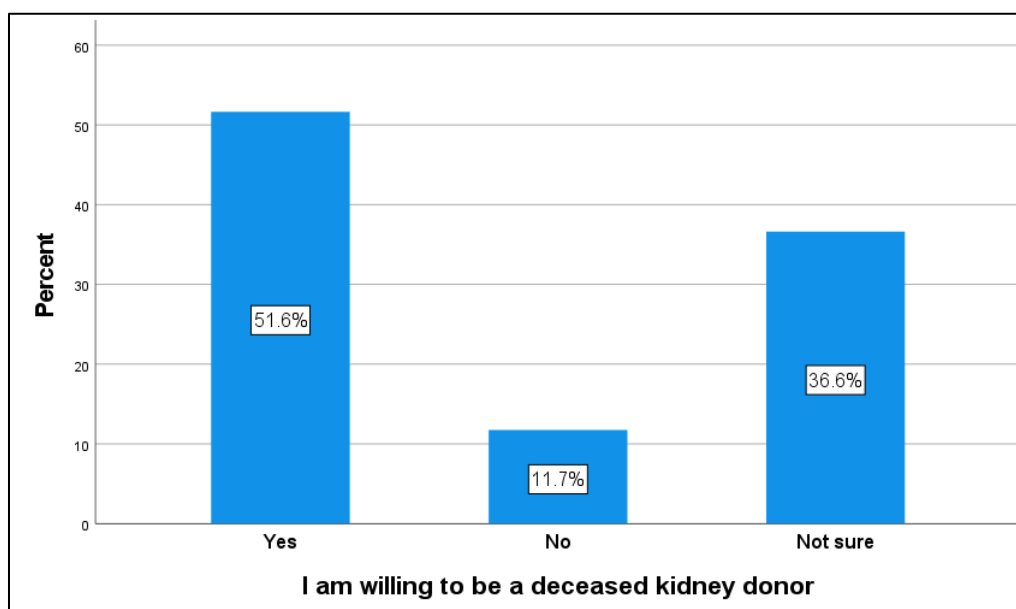


Figure 4 – Willingness to be a deceased kidney donor, n=426, May 2024

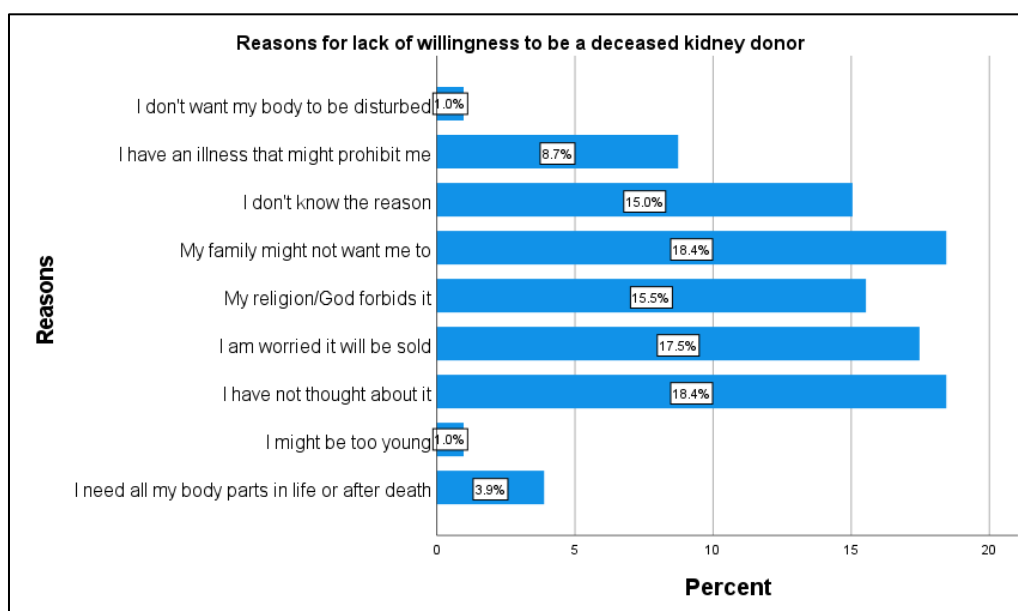


Figure 5 – Reasons for lack of Willingness to be a deceased kidney donor, n=206, May 2024

5.6 Association of willingness with socio-demographic factors, general inquiry, knowledge and attitude

Association between willingness to donate and socio-demographic characteristics (age, sex, religion, marital status, occupation, and level of education), general inquiry questions (having a relative or close friend with kidney disease or who has donated a kidney and having donated a tissue or an organ), knowledge and attitude was assessed by multinomial logistic regression. This was done separately for willingness to be a live donor for a relative and willingness to be a deceased donor.

For live kidney donation to a relative, it was found that having an unfavorable attitude decreased the odds of saying “Yes” to being a live donor compared to not sure (AOR=0.51; 95% CI: 0.29, 0.90; P value=0.02). It also increased the likelihood of saying “No” (AOR=6.26; 95% CI: 2.14, 18.27; P value=0.001) (Table 6). No other factor was found to have a significant association.

Table 6 – Association between willingness to be a live kidney donor to a relative and knowledge and attitude, n=426, May, 2024

Variable	Yes						No					
	AOR	CI Lower Boundary	CI Upper Boundary	P Value			AOR	CI Lower Boundary	CI Upper Boundary	P Value		

Knowledgeability of respondents	Poor	.786	.410	1.509	.470	.264	.049	1.320	.075
	Good	0 ^b .							
Attitude of respondents	Unfavorable	.518	.298	.903	.020	6.264	2.147	18.273	.001
	Favorable	0 ^b .							

a. The reference category is: Not sure.

b. This parameter is set to zero because it is redundant.

Abbreviations; AOR: Adjusted Odds Ration; CI: Confidence Interval.

For deceased kidney donation, it was found that having had donated a tissue or an organ previously was associated with willingness to be deceased kidney donors (AOR=1.81; 95% CI: 1.10, 2.98; P value=0.019). Having unfavourable attitude was found to be associated with saying “No” to deceased kidney donation (AOR=6.04; 95% CI: 2.63, 13.94; P value=0.000) (Table 7). No other factor was found to have a significant association.

Table 7 – Association between willingness to be a deceased donor and having donated an organ, knowledge and attitude, n=426, May, 2024

Variable		Yes				No			
		AOR	CI lower boundary	CI upper boundary	P Value	AOR	CI lower boundary	CI upper boundary	P Value
Have you ever donated a tissue or an organ?	Yes	1.811	1.100	2.981	.019	1.645	.836	6.159	.084
	No	0 ^b .							
Knowledgeability of respondents	Poor	1.423	.795	2.547	.235	1.510	.444	5.143	.509
	Good	0 ^b .							
Attitude of respondents	Unfavorable	.665	.367	1.203	.177	6.064	2.637	13.945	.000
	Favorable	0 ^b .							

a. The reference category is: Not sure.

b. This parameter is set to zero because it is redundant.

Abbreviations; AOR: Adjusted Odds Ration; CI: Confidence Interval.

6. Discussion

This study examined the knowledge, attitude and willingness towards kidney donation in Addis Ababa. It found that knowledge was poor in 358 (84%) and good in 68 (16%) of the participants. Attitude was favorable in 330 (77.5%) and unfavorable in 96 (22.5%) of the participants. In case of willingness, 265 (62.2%) said that they were willing to be a live kidney donor to a relative and 220 (51.6%) were willing to be a deceased kidney donor. In the tests of association, two factors were found to have association with willingness; having donated a tissue or an organ and attitude.

These findings show that knowledge was low even though most had a favorable attitude. It also shows that there is a good willingness to be both a live or deceased kidney donor. Participants were more willing to be a live donor to a relative than a deceased one, which follows considering the close relationship in the former. According to the study findings, willingness is affected by the attitude but not by knowledge levels which suggests that other factors influence attitude and willingness than just mere knowledge.

The low level of knowledge found in this study both compares and contrasts with other studies done worldwide. A study done in Malaysia has observed low knowledge levels (1.84 ± 0.99 , maximum score 5) which agrees with this study (26). On the other hand a study from India had found good knowledge in 76% of its respondents (27).

Studies from other African countries also show similarly varying knowledge levels. A Study from South Africa has shown low levels of knowledge (32). Report of a study from Rwanda on kidney donation showed 51% of respondents had low level of knowledge (34). Another study from Nigeria had 63.9% of its participants doing well on knowledge questions, albeit having been done on health care workers (33). These disagreements in knowledge level may have come from different factors as the studies are done in different populations from different socioeconomic status, educational background and occupations.

Studies in Ethiopia assessing knowledge are not done specifically on kidney donation but organ donation as a whole. In two studies on medical students in SPHMMC and health science students in Jimma University, knowledge levels were found to be high. With 88% of respondents adjudged to have good knowledge in the first one and students having an overall knowledge score of 3.844 which was good, in the second. This is unsurprising given that they

are university students in the fields of medicine and health sciences (35, 36). Patient companions presenting at SPHMMC, on the other hand, had low knowledge levels (only 10.6% had good knowledge) which is similar to this studies' finding (37).

The high attitude values were seen also were found in a multi-center study done in Spain, Cuba and Mexico (38). Among the Ethiopian studies, the study on medical students in SPHMMC had shown that they had poor attitude even though they had good knowledge (35). The health science students from Jimma had good attitude to go with their good knowledge (36). The study on the patient companions on the other hand corroborates this study with attitude being favorable in 52.9% of its participants (37).

The willingness level in this study mostly matches the findings from many studies, even exceeding them in some cases. A study done in Kenya showed only 39.5% being willing to sign up to be deceased donors with rates different among caregivers and healthcare providers, 34.8% versus 48.7% (40). In a similar study in three tertiary institutions in Southern Nigeria, only 29.5% were willing to be donors (41). Another study from Nigeria had 50.7% of respondents willing to be a donor to a relative (34). A study contradicting these from Kenya at Kenyatta National Hospital found higher willingness rates in its study of caregivers and healthcare workers. It found 72% and 89% willingness for live donation to a relative, and 35% and 48% for deceased donation in caregivers and healthcare workers, respectively (40).

Regarding the difference in willingness levels seen towards live donation to a relative and deceased donation, It is a finding replicated in many studies in Africa and worldwide (34, 38, and 40). The preference for donation to a relative is seen pervasively. It is explained by the close relationship and blood ties found between the donor and recipient in the case of the former. Further possible reason is the desire by people to avoid post mortem procedures and fear of it being sold.

The association of willingness with either knowledge or attitude or both is different in many studies. Some agree with this study's findings and show attitude to be a factor while others take knowledge to be a possible determinant (26, 27, 28, and 29). The differences exist in the milieu of diverse study populations with differing educational backgrounds, different cultures and value structures, which might explain the diverging findings.

7. Strength and Limitation of the Study

7.1 Strength of the study

- The study was done in the community
- Self-administered questionnaire that was translated to the local language was used which avoids information bias

7.2 Limitation of the study

- The sampling method used was convenient sampling which make generalization difficult
- Lack of qualitative methods which are needed to complement the quantitative methods to get in-depth information

8. Conclusion

The study found a comparatively low level of knowledge but high favourable attitude. There was good level of willingness especially towards live donation to a relative. Interventions addressing knowledge levels and eliminating barriers towards willingness need to be designed and implemented.

9. Recommendation

- Efforts addressing the low level of knowledge need to be carried out.
- The favorable attitude that is found needs to be further nurtured as it is found to be correlated with willingness to donate.
- Information campaigns should utilize mass media options like Television and internet media as they are found to be the most common source of information
- Educational activities should focus on creating awareness about the safety of the procedure, the absence of significant kidney disease risk after donation and the security of the procedure.
- Barriers to willingness need to be addressed through a concerted effort involving Health authorities, religious leaders, public figures as well as physicians and healthcare workers.
- Setup for kidney transplantation needs to be expanded and increased as there is a good public willingness to donate to a relative.
- Work should be undertaken to establish deceased kidney donation as willingness to do that was found among respondents.
- Further studies exploring in-depth the reasons for lack of willingness is required.

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11. Annexes

Annex 1. Consent form for participation in public knowledge attitude and willingness towards kidney donation: A cross sectional study in Addis Ababa, the Ethiopian capital.

Dear Participant,

My name is Dr Leul Yosef. I am medical doctor doing my internal medicine residency at St. Paul's Hospital Millennium Medical College. I am conducting a research with the title "Knowledge, Attitude and Willingness towards kidney Donation: A cross sectional study in Addis Ababa, the Ethiopian capital" as part of the requirements for completion of my speciality degree in internal medicine. You are invited to take part in this study.

If you decide to do so, the data collector will ask you a few short questions that will look into your knowledge attitude and willingness with regards to kidney donation and related issues. Your name and other sensitive identifying information will are not required. It will take no more than 10 minutes to complete. Your participation is entirely voluntary and there is no remuneration. You can withdraw at any moment. The data we gather will be kept strictly confidential and will only be used for the purposes of research and scientific inquiry. If you are not happy with how the session is being conducted or have any questions you can contact me with the following phone number or Email address.

Phone number - +251913670798/ +251985835015

Email Address – leulyosef12@gmail.com

Thank you for your participation

Annex 2. Data collection questionnaire for knowledge attitude and willingness towards kidney donation: A cross sectional study in Addis Ababa, the Ethiopian capital.

Instruction: Tick the box (☐) and write words or phrases when necessary. You can select multiple answers when specified.

I. Socio-demographic Characteristics		
S. N.	Question	Answer
1	Age	-----
2	Sex	☐ Male ☐ Female
3	Occupation	☐ Student ☐ Government employee ☐ Unemployed ☐ Private / self-employee
4	Marital Status	☐ Single ☐ Married ☐ Divorced ☐ Widowed
5	Level of education	☐ Illiterate ☐ Can read and Write ☐ Primary ☐ Secondary ☐ Graduate ☐ Post graduate
6	Religion	☐ Orthodox Christian ☐ Muslim ☐ Protestant ☐ Other -----
II. General Inquiry		
S. N.	Question	Answer
1	Have you ever heard of kidney donation?	☐ Yes ☐ No
2	If so, from where? (can choose more than one)	☐ Television ☐ Radio ☐ Internet ☐ Friends and Family ☐ Physician/ Health care worker ☐ Other -----
3	Do you have a relative with kidney disease or who has donated a kidney?	☐ Yes ☐ No
4	Have you ever donated a tissue or organ?	☐ Yes ☐ No
5	If so, please specify (can choose more than one)	☐ Blood ☐ Liver ☐ Other -----
III. Knowledge		
S. N.	Questions	Answers
1	For a person with kidney failure dialysis is better than kidney transplant	☐ True ☐ False ☐ I Don't Know
2	A kidney donor can live a normal life on one kidney	☐ True ☐ False ☐ I Don't Know

3	A kidney can be donated while alive or after death	☐ True ☐ False ☐ I Don't Know
4	People older than 60, People with malignancy, HIV, or hepatitis virus can never donate a kidney	☐ True ☐ False ☐ I Don't Know
5	The donor and recipient must have the same blood group for kidney donation	☐ True ☐ False ☐ I Don't Know
6	After transplant the recipient must take medications for the rest of his/her life	☐ True ☐ False ☐ I Don't Know
7	Kidney transplant is done in Ethiopia	☐ True ☐ False ☐ I Don't Know

IV. Attitude

S. N.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
1	Kidney donation is a good thing					
2	Kidney donation can save someone's life					
3	Kidney donation is against the will of GOD					
4	Kidney donation is dishonouring the dead body					
5	Kidney donation disturbs the spirit of the dead person					
6	Kidney donors are at high risk of kidney disease					
7	Kidney donors have the same lifespan as other people					
8	The dead do not need any kidneys					

V. Willingness

S. N.	Questions	Answers
1	I am willing to be a live kidney donor to a relative	☐ Yes ☐ No ☐ Not sure
	If the answer is "no" or "not sure" to the above question (1), please specify why? (can choose more than one)	☐ I am worried about the risk of surgery. ☐ I am worried about kidney disease afterwards. ☐ My religion forbids it. ☐ My family do not want me to. ☐ I have an illness that prohibits me like----- ☐ I am worried it will be sold ☐ Others. -----
2	I am willing to be a deceased kidney donor	☐ Yes ☐ No ☐ Not sure
	If the answer is "no" or "not sure" to	☐ I am worried about the risk of surgery.

	the above question (2), please specify why? (can choose more than one)	☐ I am worried about kidney disease afterwards. ☐ My religion forbids it. ☐ My family do not want me to. ☐ I have an illness that prohibits me like- ----- ☐ I am worried it will be sold ☐ Others. -----
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Annex 3. Data collection questionnaire for knowledge attitude and willingness towards kidney donation: A cross sectional study in Addis Ababa, the Ethiopian capital translated in Amharic.

- ለመልስዎ ከሚመርጡት መልስ አጠገብ የሚገኘውን ሳጥን (□) ላይ ምልክት ያድርጉ። በባዶ ቦታዎች ላይ ደግሞ አጭር መልስ በመስጠት ይሙሉ። በተመለከቱት (በተፈቀዱት) ጥያቄዎች ላይ ከአንድ በላይ መልስ መስጠት ይችላሉ።

1. መሰረታዊ መረጃዎች		
ተ. ቁ.	ጥያቄ	መልስ
1	እድሜ	-----
2	ጾታ	☐ ወንድ ☐ ሴት
3	የስራ መስክ	☐ ተማሪ ☐ የመንግሥት ሰራተኛ ☐ የግል ሰራተኛ ☐ ስራ የለኝም
4	የትዳር ሁኔታ	☐ አላገባሁም ☐ አግብቻለሁ ☐ ተፋትቻለሁ ☐ ባለቤቴን በሞት አጥቻለሁ
5	የትምህርት ደረጃ	☐ አልተማርኩም ☐ ማንበብ እና መጻፍ ☐ የመጀመሪያ ደረጃ ☐ ሁለተኛ ደረጃ ☐ ዲግሪ ☐ ሁለተኛ ዲግሪ (ማስተርስ) ☐ ሶስተኛ ዲግሪ (ፒ.ኤች.ዲ.)
6	ሃይማኖት	☐ ኦርቶዶክስ ☐ ሙስሊም ☐ ፕሮቴስታንት ☐ ሌላ -----
VI. አጠቃላይ ጥያቄዎች		
ተ. ቁ.	ጥያቄ	መልስ
1	ስለ ኩላሊት መለገስ ሰምተው ያውቃሉ?	☐ አዎ ☐ አይ
2	ከላይ ላለው ጥያቄ ቁጥር 1 መልስዎ አዎ ከሆነ፣ ከየትኛው ምንጭ? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	☐ ቴሌቪዥን ☐ ራዲዮ ☐ ከበይነ መረብ(ኢንተርኔት) ☐ ከቤተሰብና ጓደኞች ☐ ከሃኪሞች ወይም ሌሎች የጤና ባለሙያዎች ☐ ሌሎች ምንጮች -----
3	በኩላሊት በሽታ የተያዘ የቅርብ ሰው አለዎት?	☐ አዎ ☐ አይ
4	ኩላሊት የለገሰ የቅርብ ሰው(ዘመድ ወይም የቅርብ ጓደኛ) አለዎት?	☐ አዎ ☐ አይ
5	ማንኛውም የሰውነት ህዋስ ወይም አካል ለግሰው ያውቃሉ?	☐ አዎ ☐ አይ
6	ከላይ ላለው ጥያቄ ቁጥር 5 መልስዎ አዎ ከሆነ፣ የትኛውን? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	☐ ደም ☐ ጉብት ☐ ሌላ -----
VII. እውቀትን የሚያጠኑ ጥያቄዎች		
ተ. ቁ.	ጥያቄ	መልስ
1	ከፍተኛ የኩላሊት ህመም ላጋጠመው ሰው የኩላሊት እጥበት ከንቅለ ተከላ የተሻለ አማራጭ ነው	☐ እውነት ☐ ሃሰት ☐ አላውቅም
2	ኩላሊት የለገሰ ሰው በቀሪው አንድ ኩላሊት የተሟላ ጤነኛ ህይወት መኖር ይችላል	☐ እውነት ☐ ሃሰት ☐ አላውቅም

3	ኩላሊት በህይወት ሳሉ ወይም ከሞት በኋላ መለገስ ይቻላል	☐ እውነት ☐ ሃሰት ☐ አላውቅም
4	እድሜያቸው የገፋ፣ በካንሰር የተያዙ፣ በኤች.አይ.ቪ ወይም በጉበት ቫይረስ የተያዙ ኩላሊት በፍጹም መለገስ አይችሉም	☐ እውነት ☐ ሃሰት ☐ አላውቅም
5	ኩላሊት ለመለገስ ሰፊ እና ተቀባይ ተመሳሳይ የደም አይነት ሊኖራቸው ያስፈልጋል	☐ እውነት ☐ ሃሰት ☐ አላውቅም
6	ከኩላሊት ንቅለ ተከላ በኋላ ኩላሊት ተቀባይ እድሜ ልክ መድሃኒት ሊወሰድ ይገባል	☐ እውነት ☐ ሃሰት ☐ አላውቅም
7	ኩላሊት ንቅለ ተከላ በሃገራችን በኢትዮጵያ መደረግ(መሰራት) ተጀምሯል	☐ እውነት ☐ ሃሰት ☐ አላውቅም

VIII. አመለካከትን የሚያጠኑ ጥያቄዎች

ተ. ቁ.	ጥያቄ	አጥብቄ አልስማማም	አልስማማም	መካከለኛ	እስማማለሁ	አጥብቄ እስማማለሁ
1	ኩላሊት መለገስ ጥሩ ነገር ነው					
2	ኩላሊት መለገስ የሰውን ህይወት ሊያድን ይችላል					
3	ኩላሊት መለገስ ፈጣሪ የማይወደው ነገር ነው					
4	ከሞት በኋላ ኩላሊት መለገስ አስከፊነት(ሰውነቱን) አለማክበር ነው					
5	ከሞት በኋላ ኩላሊት መለገስ የሚቻል መንፈስ ይረብሻል					
6	ኩላሊት የለገሱ ሰዎች ለወደፊት የኩላሊት ህመም አደጋ ላይ ናቸው					
7	ኩላሊት የለገሱ ሰዎች ካልለገሱ ሰዎች ጋር እኩል እድሜ ይኖራሉ					
8	የሞተ ሰው ኩላሊት ምንም አይጠቅመውም					

IX. ፈቃደኝነትን የሚያጠኑ ጥያቄዎች

ተ. ቁ.	ጥያቄ	መልስ
1	በህይወት እያለሁ ለዘመድ(ቤተሰብ) ኩላሊት ለመለገስ ፈቃደኛ ነኝ	☐ አዎ ☐ አይ ☐ እርግጠኛ አይደለሁም
	ከላይ ላለው ጥያቄ ቁጥር 1 መልስዎ “አይ” ወይም “እርግጠኛ አይደለሁም” ከሆነ፣ ምክንያትዎ ምንድን ነው? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	☐ ኦፕሬሽንን መሆንን ስለምፈራ ☐ ከመለገስ በኋላ ሊከሰት የሚችል የኩላሊት ህመምን ስለምፈራ ☐ ሃይማኖቴ ስለማይፈቅድ ☐ ቤተሰቤ ስለማይፈቅድልኝ ☐ መለገስን የሚከለክል የጤና ችግር ስላለብኝ ☐ ይሸጣል ብዬ ስለምፈራ ☐ ስላላሰብኩበት ☐ ሌላ -----
2	ከሞት በኋላ ኩላሊት ለመለገስ ፈቃደኛ ነኝ	☐ አዎ ☐ አይ ☐ እርግጠኛ አይደለሁም
	ከላይ ላለው ጥያቄ ቁጥር 2 መልስዎ “አይ” ወይም “እርግጠኛ አይደለሁም” ከሆነ፣ ምክንያትዎ ምንድን ነው? (ከአንድ በላይ መልስ	☐ ሃይማኖቴ ስለማይፈቅድ ☐ ቤተሰቤ ስለማይፈቅድልኝ

	መምረጥ ይቻላል)	☐ መለገስን የሚከለክል የጤና ችግር ስላለብኝ ☐ ይሸጣል ብዬ ስለምፈራ ☐ ስላላሰብኩበት ☐ ምክንያቴን አላውቀውም ☐ ሌላ -----
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Annex 4. Work plan

Table 8 – Work plan of Knowledge Attitude and Willingness towards Kidney Donation: A Cross Sectional Study in Addis Ababa, the Ethiopian Capital.

No.	Activities	Responsibility	Time									
			February 2023	March 2023 to September 2023		December 2024 to February 2024		March 2024	April 2024		May 2024	
1	Proposal submission	PI										
2	Ethical review and clearance	PI										
3	Obtaining research fund	PI, SPHMMC										
4	Training data collectors and supervisors	PI										
5	Pretest of the questionnaire (pilot study)	DC										
5	Data collection, entry and cleaning	DC and PI										
6	Data Processing: Coding, entry and cleaning	PI										
7	Data analysis and report write up	PI										
6	Submission of first and second drafts	PI										
7	Research paper submission & presentation	PI										
8	Dissemination of results	PI										

Once Proposal is submitted and accepted, ethical clearance and funding will be obtained. Data collectors will be trained and questionnaire pretested in the month of June. Over the subsequent two months data will be collected and processed. Final paper is expected to be submitted and presented by the month of November 2023. Abbreviations; PI: Principal investigator; DC: data collectors; SPHMMC: St. Paul's Hospital millennium Medical College

Annex 5. Budget breakdown

Table 9 – Budget breakdown of Knowledge Attitude and Willingness towards Kidney Donation: A Cross Sectional Study in Addis Ababa, the Ethiopian Capital.

No.	Budget Category		Unit Cost (Birr)	Multiplying Factors	Total Cost (Birr)
1	Personnel	Training of data collectors	300/day	11 people x 01 day	3,300.00
		Data collectors	240/day	13 people x 05 days	15,600.00
	Subtotal				18,900.00
2	Materials and Equipment	Pen	20	12	240.00
		Printing	10	150	1,500.00
		Copying	5	400	2,000.00
		Binding	30	6	180.00
	Subtotal				3,920.00
3	Transport	Principal investigator	1000	1 person	1000
		Data collectors	100	11 people	1100
	Subtotal				2100.00
Grand Total					24,920.00

Data collectors will be trained for a day by the investigator. They will then be collecting data for 5 days. They will each have their transportation costs covered and be supplied with the necessary stationaries and printed out questionnaires, as will be the principal investigator. Further printing and binding costs will be incurred during the draft and final thesis submission.

Annex 6. Maps of the study area, Addis Ababa, Ethiopia



Declaration (Assurances of the investigator)

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: Dr. Leul Yosef (Internal Medicine Resident)

Signature: _____

Date: _____

Approval of the Clinical Advisor

Name of the Clinical advisor: Dr. Tsegaye Birhane MD. Internist. Consultant nephrologist.

Assistant Professor of Medicine.

Signature: _____

Date: _____