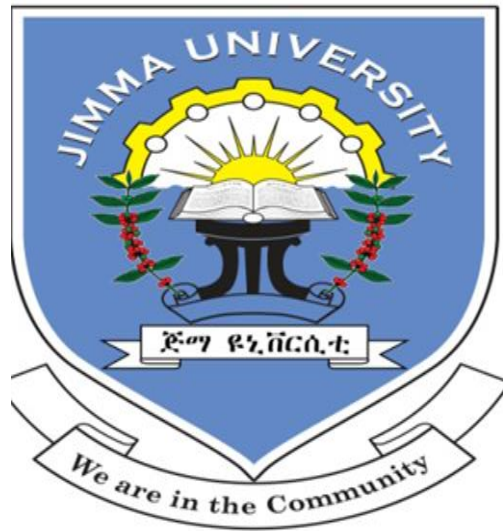


**WILLINGNESS AND ASSOCIATED FACTORS TOWARDS
CORNEAL DONATION AMONG ADULTS OF JIMMA TOWN,
OROMIA REGION, SOUTH WEST ETHIOPIA, 2018**



By: - Guteta G/Michael (MD)

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**JIMMA UNIVERSITY
INSTITUTE OF HEALTH
FACULTY OF MEDICAL SCIENCE
DEPARTMENT OF OPHTHALMOLOGY**

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By: - Guteta G/Michael (MD)

Advisors:

- 1. SisayBekela (MD, Assistant Professor of Ophthalmology)**
- 2. JaferKedir (MD, Assistant Professor of Ophthalmology)**
- 3. Aemero Abateneh (MD, Associate Professor of Ophthalmology)**

ABSTRACT

Background: A human donor is someone who chooses to donate his or her corneas after their death to people who need them (recipient). In developing countries, where the magnitude of corneal blindness is higher, the availability of donated corneas is very low. In Ethiopia, between 130 and 150 corneas are harvested yearly. However, there are more than 300,000 blind people due to corneal disease. The decision to donate one's organs is a multi-dimensional and complex process. People's knowledge and attitudes shape their intentions and willingness. Therefore, this study identifies the proportion of willingness towards corneal donation and associated factors among adults in Jimma town, Ethiopia.

Objective: To Assess Willingness and Associated Factors towards Corneal Donation among Adults of Jimma Town, Oromia Region, South West Ethiopia, 2018

Methods: A Community based cross sectional study was conducted among 413 adults living in Jimma town, Oromia region, Ethiopia. Study was conducted from April 1 to 30, 2018. Data collection was done by trained ophthalmic residents and ophthalmic nurses using semi-structured questioner. Data was cleaned, coded and entered into the EpiData version 3.1 and exported to SPSS version 20 for analysis. Bivariate and multivariable logistic regression analyses were carried out. Statistical significance was declared by the P-value < 0.05.

Result: From a total of 413 participants 51.3% of participants were willing to donate their corneas. Younger age (AOR=3.791, 95% CI: 1.814-7.924), High knowledge score (AOR=4.275, CI: 2.735-8.803) and higher educational level (AOR=3.191, CI: 2.735-8.803) were independent predictors of willingness towards corneal donation.

Conclusion: Only half of the participants showed willingness towards corneal donation. The independent predictors of willingness were age, knowledge about corneal donation and educational status. Those who were young, with high level of knowledge about corneal donation and higher educational level were more likely to be willing to donate their corneas.

Key Words- *Cornea, Corneal donation, Donor, Willingness, Corneal blindness, Jimma*

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I would like to praise GOD for keeping me alive and healthy!

I would like to thank Jimma University, Institute of Health science, department of ophthalmology for giving me this opportunity.

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ACRONYMS

ALK – Anterior Lamellar Keratoplasty

CD – Corneal Donation

AMD – Age Related Macular Degeneration

DALK – Deep Anterior Lamellar Keratoplasty

DLEK – Deep Lamellar Endothelial Keratoplasty

DSAEK – Descemet’s Stripping Automated Endothelial Keratoplasty

DSEK – Descemet’s Stripping with Endothelial Keratoplasty

EBE – Eye Bank of Ethiopia

FMoH – Federal Ministry of Health

PK – Penetrating Keratoplast

PLK – Posterior Lamellar Keratoplasty

WHO – world Health Organization

CHAPTER ONE: INTRODUCTION

1.1. BACKGROUND

The cornea is a unique portion of the outer, fibrous ocular tunic that is transparent and serves a refractive function while maintaining a mechanically tough and chemically impermeable barrier between the eye and the environment(1). For the eye to function properly, it needs these properly functioning cornea. Thus any disease affecting the cornea will lead to visual impairment or even blindness.

Corneal transplantation is when the diseased recipient cornea is replaced by healthy donor cornea. Depending on the pathology corneal transplantation can be anterior lamellar keratoplasty, deep anterior lamellar keratoplasty (DALK), posterior lamellar keratoplasty(PK), deep lamellar endothelial keratoplasty (DLEK), penetrating keratoplast, Descemet's stripping with endothelial keratoplasty (DSEK), and Descemet's stripping automated endothelial keratoplasty (DSAEK). In the year 2012 approximately 185 000 corneal transplants were performed in 116 countries, and 284 000 corneas were procured in 82 countries(2,3).

Corneal transplantation or penetrating keratoplasty is the most common type of organ transplantation procedure worldwide. In 1905 Eduard Zirm achieved the first successful human transplant in Prague. The recipient was a 45-year-old man a farmer who had sustained bilateral alkali burns(2,3).

In 1944, Paton founded the first Eye Bank in New York City; as provided by specific laws for organ donation. A human donor is someone who chooses to donate his or her corneas after their death to people who need them (recipient)(3,4)(5).

Cornea harvesting is the surgical removal from a deceased person of either the whole eye (enucleation) or the cornea (in situ corneal excision). This can be done by appropriately trained eye care personnel (eye bank technicians, ophthalmology residents, ophthalmologists, or general practitioners) in a variety of settings, including hospitals, homes, and funeral grounds(6).

Death-to-procurement protocols are established by individual eye banks. Eyes donated for transplantation must be placed in storage media within 24 hours of the time of death. Once the cornea is placed into storage media, it must be used within 2-14 days (depending on type of storage media)(7).

1.2. STATEMENT OF THE PROBLEM

The World Health Organization (WHO) estimates that the global number of people who are considered blind is 39 million and corneal opacity accounts for 1% of this blindness. Childhood blindness and corneal opacities, account for 4% of global blindness(8).

The estimated number of people visually impaired in the world is 285 million, 39 million blind and 246 million having low vision; 65 % of people visually impaired and 82% of all blind are 50 years and older(9).

In Ethiopia blindness secondary to corneal pathology (trachomatous corneal scarring and other causes of corneal opacity) accounts for 19.3%(10).

In Ethiopia, the major causes of blindness are cataract (49.9%), trachomatous corneal opacity(11.5%), refractive error (7.8%), other corneal opacity (7.8%), glaucoma (5.2%) and macular degeneration (4.8%) and the major causes of low vision are cataract (42.3%), refractive error (33.4%), trachomatous corneal opacity (7.7%), other corneal opacity (5.9%) and macular degeneration (4.6%)(10).

Per year, approximately 185,000 corneal transplants were performed in 116 countries, and 284 000 corneas were procured in 82 countries(2).

The waiting-list data provided by 134 countries, covering 91% of the world's population, showed that approximately 12.7 million people were awaiting a transplantation, but only 1 in 70 of the needs are covered worldwide(11).

The decision to donate one's organs is a multi-dimensional and complex process. People's attitudes shape their intentions, and from those intentions come actions. The drivers behind each step of the decision pathway can change. For example, one research found that perceptions of the

benefits of organ donation and altruistic motives had the greatest impact on support (attitudes and intentions), while respondents' knowledge on how to register was the most important on whether someone was actually registered (actions) (12).

In order for individuals to move along the pathway, they may need multiple interventions that reinforce and build on each other over time. Where people have limited knowledge, campaigns might focus on changing attitudes through knowledge building and myth-busting. For people who have already made the decision to donate, campaigns might focus on changing that intention into action (eg, by encouraging family discussions to ensure an individual's wishes are known)(13).

Although willingness, attitudes and beliefs surrounding solid-organ donation have been extensively investigated, much less is known about corneal donation. A large study in US on over 10 000 patient charts demonstrated that while consent for organ donation was 46.5%, consent for corneas was only 23.5%(14).

In developing countries, where the magnitude of corneal blindness is higher, the availability of donated corneas is very low. In Ethiopia, between 130 and 150 corneas are harvested yearly. However, there are more than 300,000 blind people due to corneal disease. This depicts that there is a huge gap between demand and supply of corneal graft. Despite this fact there is limited data which assess the limiting factors affecting the donation rate and their willingness to pledge their cornea(6).

In Gonder, Ethiopia, around 57% of the participants heard about eye donation before but only 23.7% of them have good level of knowledge and the proportion of willingness is 37.6%(15).

There are limited data that show Willingness towards corneal donation in Jimma town, Ethiopia. So, this study will assess the willingness towards corneal donation and identify associated factors affecting their willingness to pledge their corneas.

1.3. SIGNIFICANCE OF THE STUDY

Blindness secondary to corneal disease is one of commonest cause of blindness especially in developing countries. For this problem, one option of treatment is corneal transplantation. There

is higher demand of corneal tissue when compared to the availability of corneal tissue in the eye bank. One of the reason for these is lower rate of corneal donation. A good knowledge about corneal donation with positive attitude towards donation facilitates a people's willingness to pledge their cornea.

There is no population based study done in Jimma town regarding their willingness towards corneal donation. Therefore, this study identifies the proportion of willingness towards corneal donation and associated factors among adults in Jimma town, Ethiopia.

CHAPTER TWO: LITERATURE REVIEW

2.1.PROPORTION OF WILLINGNESS TOWARDS CORNEA DONATION

Willingness surrounding solid-organ donation have been extensively investigated, much less is known about corneal donation. This is important as rates of corneal donation are much lower than those for solid organs, suggesting there is something different about corneal donation. A large US study of over 10 000 patient charts demonstrated that while consent for organ donation was 46.5%, consent for corneas was only 23.5%. Similarly in Australia willingness towards solid-organ donation is higher than corneal donation(16)(17).

Study done in United State on 369 participants who responded to the question regarding their willingness to donate corneas, 216 (59%) indicated that they would be willing to donate their corneas, while 153 (41%) indicated that they would not(18).

Study done in general Population of Odisha in Eastern India, out of 452 participants, 56.6% willing to donate their eyes.(19) Study done in rural population of Andhara Pradesh, southern India shows proportion of willingness is 32.9%(20).

Study done on awareness and willingness among shopkeepers in Department of Ophthalmology, Tertiary Care Hospital in Pune, shows willingness to pledge their eyes was 19.83%. Study done on awareness and willingness of eye donation among attendants of patients in rural Karnataka of India shows awareness of eye donation in 182 (91%) participants. Of the 182 participants who were aware of eye donation, only 108 (59.34%) were willing to donate eyes(19).

Study done on Singaporean adults, shows 67% of participants were willing to donate their cornea(17).

Study done on Awareness and Willingness among Patients Attending a Tertiary Eye Center in Ghana shows that willingness to donate eyes after death were 321(59.90%)(21).

Study done in Gonder, Ethiopia on willingness towards corneal donation the proportion of willingness among a total of 774 participants, is 37.6%. Similarly in central part of Ethiopia the proportion of willingness shows 57.9%(15)(22).

2.2.FACTORS AFFECTING WILLINGNESS

According to Michelle J. Irving and co, the decision to be an organ donor was influenced by (i) relational ties; (ii) Religious beliefs; (iii) cultural influences; (iv) family influences; (v) body integrity; (vi) previous interactions with the health care system—medical mistrust, validity of brain death and fear of early organ retrieval; and (vii) the individual's knowledge about the organ donation process(23).

Study done in Singapore on knowledge and willingness towards corneal donation shows, younger age, male sex, and higher educational level show higher rate of willingness(17). They had good awareness on corneal donation (80.7% of all respondents had heard of corneal donation) but on specific knowledge assessment their response is poor. Those who score higher in knowledge question, and those who have positive attitude are more likely to donate(17).

In Malaysia a total of 400 subjects of Malay, Chinese, and Indian races participated in the study and showed awareness of eye donation to be 69%. Individuals with a higher education level (graduate and above), the younger age group (18–45 years), individuals of paramedical occupation, and females were more aware of eye donation(24). The most important source of awareness was the media (55.4%) with newspapers topping the list (36.7%). Of the 276 participants who were aware of eye donation, only 34.42% were willing to donate eyes(24).

A study was conducted on awareness of eye donation in an adult (age 35-80 years) population of southern India. The study population of 507 participants chosen by systemic random sampling was interviewed using structured questionnaire. Two hundred and fifty-seven (50.69%) participants were aware of eye donation. The major source of knowledge was publicity campaigns. Younger age, male sex, literate and urban residency shows more likely to donate cornea(25).

A study was conducted on awareness of eye donation in the rural population of India. The study population of 7775 participants of all age was chosen by a systematic, cluster, stratified random samplings who were interviewed by trained investigators. Before going through the clinical examination, subjects above 15 years of age responded to a structured questionnaire on eye donation. Data were analysed for 5,572 (71.7%) subjects who were above 15 years. A total of

1,561 (28%) subjects were aware of eye donation. Age-gender adjusted prevalence of awareness of eye donation was 30.7 %. One hundred and eighty (11.5%) subjects had knowledge about eye donation. The source of information for awareness of eye donation was mass media in 1237 (79.2%) subjects and a family members, relatives or friends in 297 (19%) subjects. Awareness of eye donation was significantly higher in subjects 30-69 years old and significantly lower among those aged 70 years of age(20).

According to Study done In Ghana on patients attending tertiary hospital, Awareness of eye donation and willingness to donate eyes after death were observed in 45 (8.40%) and 321(59.90%) of respondents respectively(26).

Study done in Malaysia showed that 84.5% were aware that eye donation is not against their religion and 76.2% knew that it does not cause any disfigurement of the face. Also Educational status did not influence the willingness to donate eyes(24).

Study done in Gondar, Ethiopia on 774 adults with a median age of 30 ± 14.33 years participants, around 57% of the participants heard about eye donation before and their knowledge were assessed using 11 question. Overall, 23.7% of the participants had a good level of knowledge about eye donation. Having a thought of that eye donation is pleased (69.75%) and a noble act (19.7%) was the main reasons given for being willing to donate eyes(15).

Study done in Wolkite town, Central Ethiopia, a total of 492 adults aged 18 years and older were assessed for awareness and shows, 152 (30.9%) were aware of eye donation and the major sources of information were TV (65.1%) and Radio (39.5%).(22)130 (85.5%) had positive attitude in that they believed eye donation could help someone blind to see again and 83.1% of participants with positive attitude show willingness to pledge their cornea(22).

CONCEPTUAL FRAMEWORK

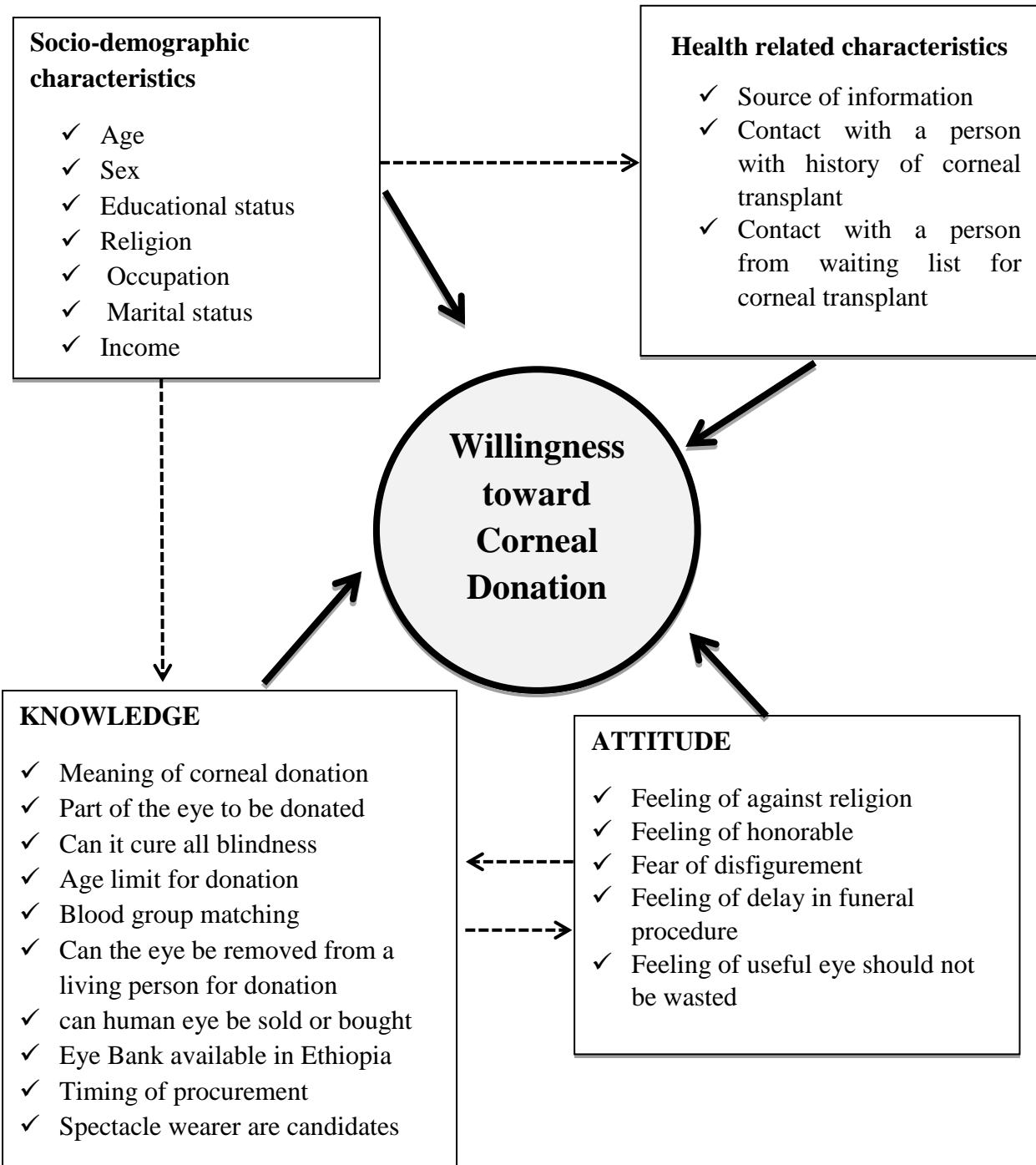


Figure 1: Conceptual frame work Corneal donation willingness and associated factors, Jimma town, Ethiopia 2018. (adapted from different literatures)

Label: = Direct association

= Indirect association (not studied in this study)

CHAPTER THREE: OBJECTIVES OF THE STUDY

3.1. GENERAL OBJECTIVE

To assess proportion of willingness and associated factors towards corneal donation among adults living in Jimma town, Oromia region, Ethiopia, 2018

3.2. SPECIFIC OBJECTIVES

1. To assess proportion of willingness towards corneal donation among adults living in Jimma town, Oromia region, Ethiopia, 2018
2. To identify factors associated with willingness towards corneal donation among adults living in Jimma town, Oromia region, Ethiopia, 2018

CHAPTER FOUR: METHODS AND MATERIALS

4.1. STUDY AREA AND PERIOD

Jimma town is the administrative center of Jimma Zone which is located in the southwest of Ethiopia & Western Oromia region, 352 km far from the capital city, Addis Ababa (AA). Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), Jimma town has a total population of 120,960, of whom 60,824 are men and 60,136 women. With an area of 50.52 square kilometers, Jimma has a population density of 2,394.30 all are urban inhabitants. The three largest ethnic groups reported in Jimma were the Oromo (46.71%), the Amhara (17.14%) and the Dawro (10.05%); all other ethnic groups made up 26.1% of the population. Regarding religion Ethiopian Orthodox Christianity is 46.84%, while 39.03% of the population were Muslim, and 13.06% were Protestant(27).

Jimma University is one of the biggest University in Ethiopia, which resides in Jimma town and provides the only tertiary eye care in ophthalmology department for south west of Ethiopia.

The study was conducted from April 1- 30, 2018.

4.2. STUDY DESIGN

Community based cross sectional study was done.

4.3. POPULATION

4.3.1. SOURCE POPULATION

All adults age 18 years and above living in Jimma town, Oromia region, Ethiopia during the study period

4.3.2. STUDY POPULATION

All adults age 18 years and above living in randomly selected kebeles in Jimma town, Oromia region, Ethiopia during the study period

4.3.3. STUDY UNIT

Randomly selected adults age 18 years and above living in randomly selected households in Jimma town, Oromia region, Ethiopia during the study period

4.4. INCLUSION AND EXCLUSION CRITERIA

4.4.1 Inclusion criteria

All adults (age 18 years and above) living in Jimma town, Oromia region, Ethiopia and available during the study period

4.4.2 Exclusion criteria

Mentally and/or seriously ill

Bilaterally blind person

Residing for less than six month

4.5. SAMPLE SIZE AND SAMPLING TECHNIQUE

4.5.1 SAMPLE SIZE DETERMINATION

Using Epi Info version 7 with the assumptions of

95% Confidence level, margin of error 5%, 10% non-response rate,

Table 1: Sample size determination for corneal donation willingness and associated factors, Jimma town, Ethiopia 2018.

Population	Proportion of WCD	Sample size	10% non response	Final Sample size
Proportion of willingness central Ethiopia(22)	57.9%	374	39	413
Proportion of willingness Gonder, Ethiopia(15)	37.6%	360	36	396

Therefore; the final sample size was **413** adults.

4.5.2. SAMPLING TECHNIQUE

From all 13 kebeles of Jimma town, 4 kebeles were selected by lottery method and sample size was allocated proportionally. Systematic random sampling method was used to select the households (K= 28). For households where more than one adults were present lottery method was used. If the household is closed or no adult in the house, the next household was taken.

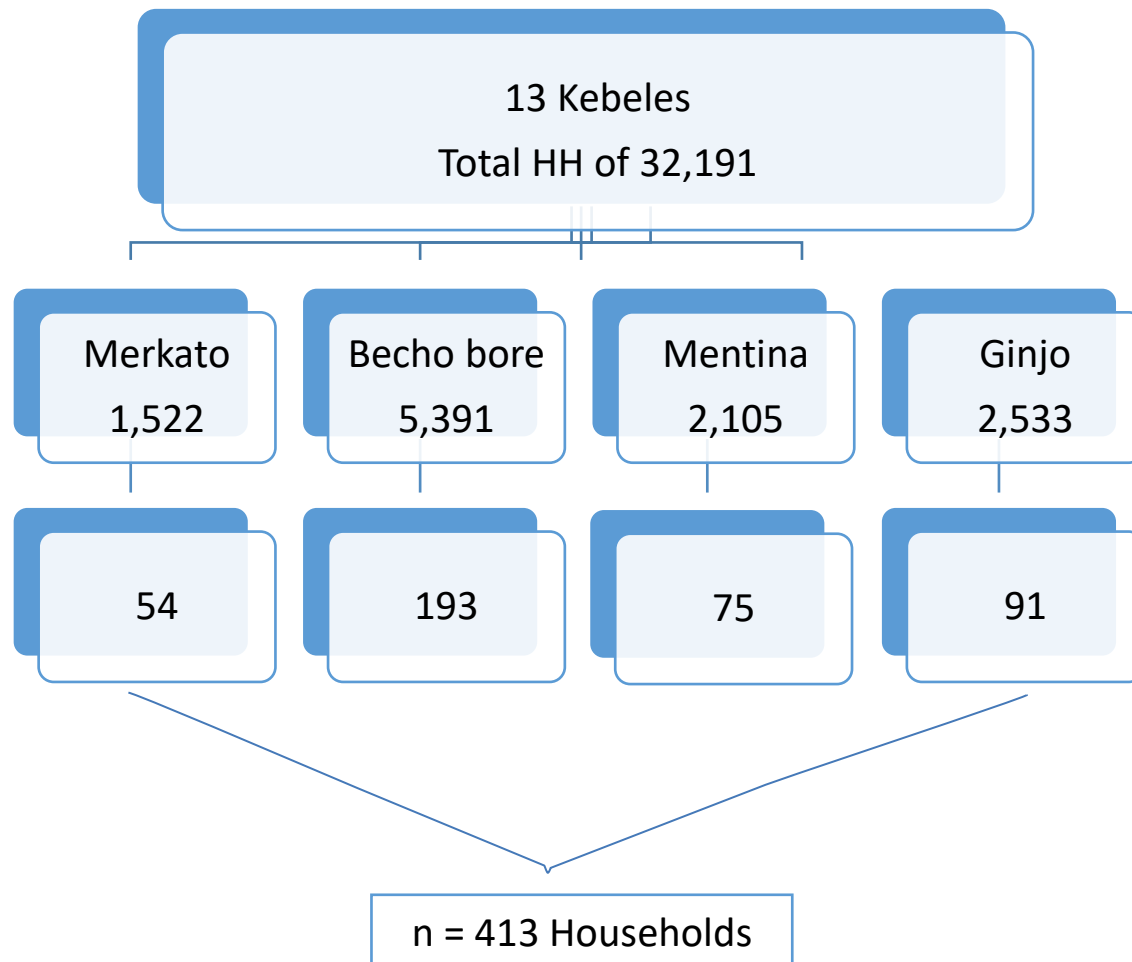


Figure 2: Sampling technique for the corneal donation willingness and associated factors, Jimma town, Ethiopia 2018.

4.6. DATA COLLECTION TOOLS AND PROCEDURES

4.6.1. DATA COLLECTION TOOLS

Semi- structured questionnaire was developed based on the objective of the study and after reviewing relevant literatures. The questionnaire was first prepared with English language and interpreted to local language (Amharic and Afan Oromo) by language experts. First it was used to conduct the pilot study; later, it was used in the main study.

The questionnaire was composed of 4 sections. Section 1 asked about sociodemographic characteristics of the participant and the rest of sections were about the knowledge, attitude and willingness towards corneal donation of the participant. Two questions were open ended questions where the participants write their perceived reason for their being willing or not willing to donate their corneas after death.

4.6.2. DATACOLLECTION PROCEDURE

Face to face interview was done by five ophthalmic residents and ophthalmic nurses.

4.7. STUDY VARIABLES

4.7.1 DEPENDENT VARIABLE

Willingness towards corneal donation

4.7.2. INDEPENDENT VARIABLES

Socioeconomic and demographic characteristic

Age, Sex, Educational status, Religion, Occupation, Marital status, Income

Health related characteristics

Source of information

Contact with a person with history of corneal transplant

Contact with a person from waiting list for corneal transplant

Attitude related Characteristics

Feeling of against religion

Feeling of act of honor

Fear of disfigurement

Feeling of delay in funeral procedure
Feeling of useful eye should not be wasted

Knowledge related Characteristics

Meaning of corneal donation
Part of the eye to be donated
Can it cure all blindness?
Age limit for donation
Blood group matching
Can the eye be removed from a living person for donation?
Can human eye be sold or bought
Eye Bank available in Ethiopia
Timing of procurement
Spectacle wearers are candidates

4.8. DATA ANALYSIS PROCEDURE

Data were entered into EpiData version 3.1 and then exported to SPSS version 20 for windows where recoding, computing, counting and other statistical analysis of the variables were done. First univariate analysis was conducted to see frequency distribution, central tendency and shape of the overall distribution of independent variables.

Bivariate logistic regression was done on selected candidate variables (p value < 0.25) for multivariable logistic regression. To identify independent predictor of willingness towards corneal donation and to control confounder, multivariable logistic regression model were fitted using backward method. In multivariable logistic regression, adjusted odds ratio with its 95% Confidence Interval were computed for variables maintained in the final model and statistical significance were declared by the P -value < 0.05 . Model fitness checked by using Hosmer and Lemeshow test. Model is fit with 8 degree of freedom and 0.618 significance level.

Thematic analysis was employed manually for the two open ended questions and the result was narrated.

4.9. DATA QUALITY MANAGEMENT

Data collectors were ophthalmic residents and ophthalmic nurses trained for one day on the objectives of the study, on data collection ethics and familiarization with the questionnaire to increase accuracy and completeness of the data. All the data were checked for completeness, accuracy, and consistency by one supervisor and principal investigator daily.

After data collection the data were checked for completeness and consistency, coded manually, and finally entered to prepared template scheme on EpiData version 3.1 by controlling legal values.

4.10. ETHICAL CONSIDERATION

Ethical clearance was obtained from Institutional review board of Jimma University institute of health science, Research and Community Service Office. Permission letter was obtained from Jimma town administration office and from each kebele administration office. By assuring the confidential nature of responses and informed verbal consent was obtained from the study participant's and data collection was conducted.

4.11. OPERATIONAL DEFINITIONS

A human corneal donor- someone who chooses to donate his or her corneas after their death to people who need them (recipient) and carry registration card.

Willingness to donate own eye/cornea - was categorized as willing if the participant had the interest to pledge his/her eye/cornea after death and unwilling if the participant was involuntary to donate his/her eye/cornea after death or not decided.

Information (awareness) about corneal donation – whether the participant heard, read or was told about corneal donation 30 days prior to the survey.

Knowledge about corneal donation - assessed using ten questions. Each question was given a score of 1 for correct answer and 0 for incorrect or I don't know answer. The score was summed and categorized into three groups. High level if they score 8 and above, medium level if they score 6 to 7 and low level if they score 5 and less.

Attitude towards corneal donation – assessed using 5 statement regarding corneal donation and two of them are positive statements and the others are negative statements. It was assessed using 5 point Likert scale, and the rating scale was measured for positive statement as follows

with choices strongly agree, agree, neutral, disagree, and strongly disagree and scores 5, 4, 3, 2, and 1, respectively. It was reversed for negative statements. The score ranges from 5 to 25 and the mean of the score was taken. The score of 15 and above is taken as positive attitude and less than 15 was taken as negative attitude.

4.12. DISSEMINATION PLAN

The results of the study will be presented to Jimma University Institute of Health, Faculty of Medical Science Department of Ophthalmology. Also it will be handed to JU hospital Management Board, Jimma town health office, and different stake holders. In addition an attempt will be made to publish the paper in local or international journals.

CHAPTER FIVE: RESULT

5.1. Socio-Demographic Characteristics

A total of 413 adults from Jimma town participated in the survey. The mean age of the study participants was 30.64 years (range: 18–70 years, standard deviation: 11.299), with the majority of them (52.3%) are in the age range of 18–29(216) years. Male participants were 246 (59.6%) and female participants were 167(40.4%). The major religions of the participants were Orthodox Christianity, Islam and Protestant Christianity, accounting for 41.6%, 28.6% and 26.4% respectively. The educational level of most of participants was higher education 42.9% and government employee’s account for 112(27.1%) and most of the participants were married 221(53.5%). Monthly income of most of the participants 208(50.4%) was two thousand and above.

Table 2: Socio-demographic and economic characteristics of study participants, Jimma town, South West, Ethiopia, 2018 (n = 413)

Variable		Frequency	Percentage
Sex	Male	246	59.6
	Female	167	40.4
Age	18-29	216	52.3
	30-39	115	27.8
	40-49	39	9.4
	>= 50	43	10.4
Religion	Muslim	118	28.6
	Orthodox	172	41.6
	Protestant	109	26.4
	Other	14	3.4
Ethnicity	Oromo	183	44.3
	Amhara	92	22.3
	Southern nation and nationalities	75	18.2
	Other	63	15.3

Educational Status	No formal education	70	16.9
	Primary school	72	17.4
	Secondary school	94	22.8
	Higher education	177	42.9
Occupation	Government	112	27.1
	Non-Government	260	63.0
	Student	41	9.9
Marital status	Single	165	40.0
	Married	221	53.5
	Divorced	10	2.4
	Widowed	17	4.1
Income	2,000birr and above	208	50.4
	Less than 2,000birr	160	38.7
	Family dependent	45	10.9

5.2. Proportion of willingness towards corneal donation

Of the 413 participants who responded to the question regarding their willingness to donate their cornea, 212 (51.3%) indicated that they would be willing to donate their corneas, while 201 (48.7%) indicated that they are not willing to pledge their cornea. From those willing to pledge their cornea, 'It is pleased to help blind person' 84(39.6%) and 'Noble and satisfactory act' 49(23.1%) were the two main reasons given to be willing. 'I need more information' 70(34.8%) and 'against my religion' 32(25.9%) were the two main reasons given by the participants who were not willing.

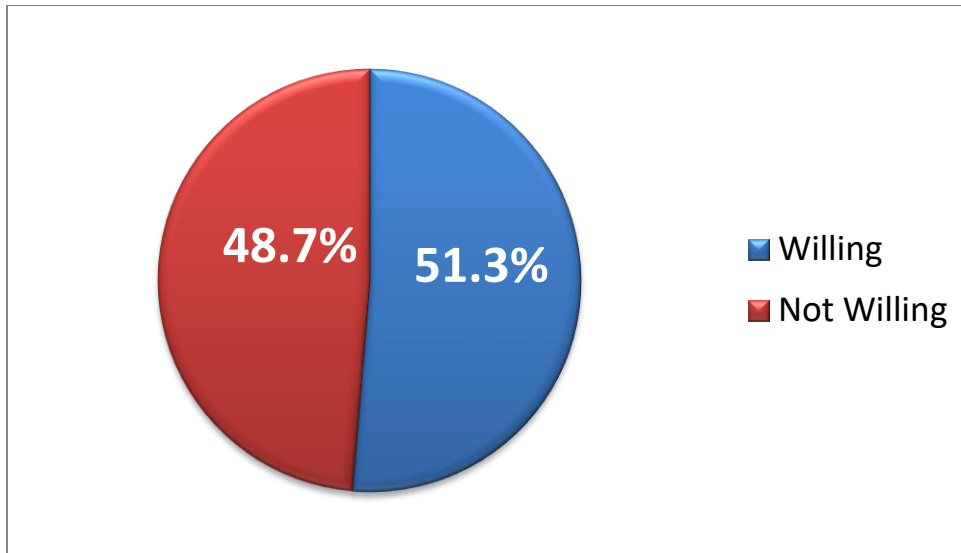


Figure 3: Proportion of Willingness towards corneal donation among adults in Jimma town, 2018

Majority 84(39.6%) of participants who are willing, perceived that donating cornea is helping a blind person to see. Among other reasons put by participants as their main reason for their willingness are listed in the following table. (Table 3)

Table 3: Participants perceived reason for Willingness towards corneal donation, Jimma town, Ethiopia 2018.

Participants response	Frequency	Percent (%)
It is pleased to help blind person	84	39.6
Noble and satisfactory	49	23.1
My eye are not useful to me after death	34	16.0
It may change the recipients way of living	22	10.4
Other reasons	23	10.8
Total	212	100.0

Majority 70(34.8%) of participants not-willing perceived that they need more information to be willing in donating their cornea. (Table 4)

Table 4: Table 5: Participants perceived reason for un-willingness towards corneal donation, Jimma town, Ethiopia 2018.

Participants response	Frequency	Percent (%)
I need more information	70	34.8
Against my religion	32	15.9
It is not done in Ethiopia	22	10.9
My family don't allow	20	10.0
I need it for my after life	17	8.5
no reason	18	9.0
Other reasons	22	10.9
Total	201	100.0

5.3. Other findings of the study

The main 266(64.4%) source of information is media especially television. Most of participants 290(70.2%) know the presence of eye bank in Ethiopia. Participants who put “against my religion” as their main reason for un-willingness 18(56.2%) are from Muslim religion.

5.4. Willingness towards corneal donation and associated factors

In bivariate logistic regression nine variables (Age of Participant, Educational status, Marital Status, Source of Information, Information about CD, Knowing a person who had corneal transplant, Knowing a person who is on waiting list to receive cornea, Attitude about CD, knowledge about CD) were candidate for multivariable logistic regression. (Table 5)

Table 5: Factors affecting willingness towards corneal donation, Jimma town, Ethiopia 2018.

Factors	Variables categories	Willingness CD		Total (413)	Crude Odds Ratio (95% C.I)	P-Value
		Yes	No			
Age of Participant	18 to 29	137(63.4%)	79(36.6%)	216	3.592(1.792-7.200)	.000
	30 to 39	47(40.9%)	68(59.1%)	115	1.432(.684-2.996)	.341
	40 to 49	14(35.9%)	25(64.1%)	39	1.160(.465-2.893)	.750
	50 and above	14(32.6%)	29(67.4%)	43	1	.000*
Educational status	No Formal Education	20(28.6%)	50(71.4%)	70	1	.001*

	Primary School	41(56.9%)	31(43.1%)	72	3.306(1.646-6.642)	.001
	Secondary School	49(52.1%)	45(47.9%)	94	2.722(1.410-5.255)	.003
	Higher Education	102(57.6%)	75(42.4%)	177	3.400(1.869-6.184)	.000
Marital Status	Married	100(45.2%)	121(54.8%)	221	.590(.399-.872)	.008*
	Not married	112(58.3%)	80(41.7%)	192	1	
Source of Information	Media	151(56.8%)	115(43.2%)	266	1.050(.276-4.0)	.942
	School	10(50.0%)	10(50.0%)	20	.800(.165-3.885)	.782
	Health care worker	46(39.0%)	72(61.0%)	118	.511(.130-2.003)	.335
	Family or Friend	5(55.6%)	4(44.4%)	9	1	.016*
Information about CD	Yes	170(55.4%)	137(44.6%)	307	1.891(1.206-2.964)	.005*
	No	42(39.6%)	64(60.4%)	106	1	
Knowing a person who had corneal transplant	Yes	49(66.2%)	25(33.8%)	74	2.116(1.250-3.584)	.005*
	No	163(48.1%)	176(51.9%)	339	1	
Knowing a person who is on waiting list	Yes	32(62.7%)	19(37.3%)	51	1.703(.931-3.115)	.084*
	No	180(49.7%)	182(50.3%)	362	1	

Attitude towards WCD	Positive	185(54.6%)	154(45.4%)	339	2.091(1.244-3.515)	.000*
	Negative	27(36.5%)	47(63.5%)	74	1	
Knowledge towards CD	High	71(70.3%)	30(29.7%)	101	4.275(2.522-7.246)	.000*
	Medium	79(57.2%)	59(42.8%)	138	2.419(1.530-3.825)	.000
	Low	62(35.6%)	112(64.4%)	174	1	.000

* Candidate for Multivariable Logistic Regression

5.5. Independent predictors of willingness towards corneal donation

Three independent predictors were identified by multivariate logistic regression (Age of Participant, Educational status, knowledge about CD) to be a statistically significant factors of willingness towards corneal donation among adults in Jimma town. (Table 6)

Willingness towards corneal donation was 3.8 times more likely among adults aged 18 to 29 when compared to adults age 50 and above (3.791(1.814-7.924)).

Willingness towards corneal donation was 3.4 times more likely among adults with higher education level when compared to adults who have no formal education. Odd of willingness towards corneal donation was 2.7 among adults with secondary education when compared to adults who have no formal education. Willingness towards corneal donation was 3.3 times more likely among adults with primary educational level when compared to adults who have no formal education.

Chance of willingness towards corneal donation was 5 times more likely among adults with higher knowledge about CD (corneal donation) when compared to adults who have low knowledge about CD. Willingness towards corneal donation was 2.3 times more likely among adults with medium knowledge about CD when compared to adults who have low knowledge about CD.

Table 6: Independent factors which predict willingness towards corneal donation, Jimma town, Ethiopia 2018.

Factors	Variable	Willingness CD		Odds Ratio (95% C.I)	
		Yes	No	COR	AOR
Age of Participant	18 to 29	137(63.4%)	79(36.6%)	3.592(1.792-7.200)	3.791(1.814-7.924)**
	30 to 39	47(40.9%)	68(59.1%)	1.432(.684-2.996)	1.346(.611-2.965)
	40 to 49	14(35.9%)	25(64.1%)	1.160(.465-2.893)	1.134(.422-3.047)
	50 and above	14(32.6%)	29(67.4%)	1	1
Educational status	No Formal Edu.	20(28.6%)	50(71.4%)	1	1
	Primary	41(56.9%)	31(43.1%)	3.306(1.646-6.642)	3.7(1.719-7.965)*
	Secondary	49(52.1%)	45(47.9%)	2.722(1.410-5.255)	3.179(1.543-6.551)*
	Higher	102(57.6%)	75(42.4%)	3.400(1.869-6.184)	3.191(1.661-6.130)**
Knowledge CD	High	71(70.3%)	30(29.7%)	4.275(2.522-7.246)	4.907(2.735-8.803)**
	Medium	79(57.2%)	59(42.8%)	2.419(1.530-3.825)	2.348(1.434-3.845)*
	Low	62(35.6%)	112(64.4%)	1	1

**Statistically significant p<0.01,* statistically significant p<=0.05, 1-Reference

CHAPTER SIX: DISCUSSION

In this study, about half (51.3%) of adults in Jimma town, Oromia region, Ethiopia have willingness towards corneal donation. The finding of the study is consistent with other studies. The proportion is lower than the studies done in Singapore (67%)(28), Australia (59%)(18), Odisha in Eastern India (54.6%)(19), Ghana (59.9%)(21), and Central Ethiopia (57.9%)(22), but; higher than studies done in, Malaysia(34.42%)(24), and Gonder Ethiopia(37.6%)(15).

Similar studies were done in other parts of Ethiopia (central Ethiopia and Gonder Ethiopia). The proportion of willingness in this study is comparable with that of central Ethiopia (57.9%) when compared to that of Gonder Ethiopia (37.6%). This difference may be explained by geographical location (Jimma town is near to Wolkite town (central Ethiopia) compared to Gonder town), and population characteristics.

Regarding perceived reasons to be willing to donate their corneas('it is pleased to help blind person' 39.6% and 'noble and satisfactory act' 23.1%), were the main and these reasons were stated also in other studies like in Singapore, and other parts of Ethiopia(28)(15). This may be due to altruistic behavior of most human beings to help blind person.

Participants who were unwilling to donate their cornea put their main reason as 'I need more information' 34.8% and against my religious belief 15.9%. These reasons were also seen in different studies like Australia, India and Ethiopia(18)(19)(15). These reasons are important as they are main limiting factors for willingness. Before willingness, someone wants to understand or know about corneal donation. Even in this study participants who had information or awareness have 2 times more likely to be willing to donate their corneas than who have no awareness. This is also supported by other studies.

In this study, one of the reasons for unwillingness towards corneal donation were 'I don't think corneal transplantation is done in Ethiopia' 17(8.5%). This may be due to their lack of information about the procedures done in Ethiopia and also due to the fact that this procedure is mainly done capital city of Ethiopia(6).

On multivariate regression analysis three independent predictors (Age, knowledge level and educational status) of willingness towards corneal donation were identified. Those who are younger, who have high knowledge about corneal donation and who have higher education level were more likely to be willing to donate their corneas.

Younger respondent (18-29 years) were 3.8 times more likely to be willing to donate their cornea compared to older participants (age 50 years and above). A similar study done in Ghana also showed that younger age groups were more willing than older age. They were 5.9 times more willing than older ages(21). This may be due to their exposure to medias especially internet. In studies done in Singapore, India and Ethiopia, there was no statistically significant association

between age and willingness towards corneal donation(15,19,29). This May be due to difference in age categorization or generalized population characteristics.

Our study showed that participants who have high knowledge about corneal donation were more willing to donate their cornea. Those who have high knowledge level were 4.3 times and those who have medium knowledge level were 2.4 times more likely to be willing to donate their cornea than those who have low knowledge level. If someone knows he/she can save the sight of another person they will have some interest or intention to save the sight of a blind person. This result is also supported by other studies. Study done in Singapore shows those who answered knowledge question correctly are more willing to donate their cornea than those who answered incorrectly(28). Similarly, other studies in Malaysia and Ethiopia also show knowledge is important factor for willingness(24)(15).

Another independent predictor identified in our study was educational status. Those participants who have higher educational status (college/University) were 3.4 times, secondary school 2.7 times and primary school 3.3 times more likely to be willing to donate their cornea when compared to those who have no formal education. This showed that as the educational status of individuals increases, their knowledge about corneal donation increases, which alter their attitude towards corneal donation. This finding is also similar with other studies like studies from Singapore, Ghana and Ethiopia(15,26,28)(30).Unlike this, study from Australia shows those individual who have higher educational status are tend to be unwilling to donate their cornea(18).

STENGTH AND LIMITATION OF THE STUDY

STENGTH

This study is the first community based study where it identified important factors regarding willingness towards corneal donation, which is important to address during community mobilization.

LIMITATION

This study haven't explored the factors and reasons of the participant's willingness or unwillingness towards corneal donation by in-depth interview and/or focused group discussion.

Recall bias could be there since participants may forget weather they heard or not about corneal donation.

Social desirability bias since participants may think willingness is the right and acceptable answer.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1. CONCLUSION

Only half of the participants showed willingness towards corneal donation. The independent predictors of willingness are age, knowledge about corneal donation and educational status. Those who are young, have high level of knowledge about corneal donation and with higher educational level are more likely to be willing to donate their cornea.

7.2. RECOMMENDATIONS

MOH and partner Organizations: To meet the need of cornea for corneal transplantation the willingness of the people to donate their cornea is very important. Simplified teaching materials about corneal blindness, concept of corneal grafting and corneal donation has to be prepared and disseminated to health care professionals especially to health extension workers.

Mass media owners: Television and radio programs about corneal donation has to be prepared for the people to increase their awareness and willingness towards corneal donation.

Jimma University Health Institution Department of Ophthalmology: Regular education about corneal donation should be given to patients and attendants at waiting area when they come for their eye problem and also during outreach program.

Researchers: Explorative (qualitative) study has to be done in order to identify important factors for their reason for willingness and unwillingness.

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DEPARTMENT OF OPHTHALMOLOGY

Annex – 1: Information sheet for study participants

I am _____. I am collecting a data for a study on willingness towards corneal donation among adults of jimma town. The information you will give us is very important because, it will help this study in revealing communities general willingness towards corneal donation.

So I am going to ask you some questions concerning your willingness and related questions towards corneal donation. There is no obligation in participating in the study. The information obtained from you will be kept confidential and will be used for the research purpose only. You don't need to state your name. If you agree to participate in the study please answer these questions. You can also leave the research any time you want to leave.

Are you willing to participate in this study? Yes_____ No_____

If you have any questions concerning the study you can contact the principal investigators by the address found below.

Name of the principal investigator : Guteta G/Michael (M.D)

Address: Phone- 09-19-206325-----E-mail – guteta07@gmail.com

ANNEX-2 QUESTIONER

Section One –English Questionnaire

Section One: Socio demographic information			
S.N	Questions and filters	Coding category	Skip
101	Code No		
102	Kebele		
103	Age in completed years	_____ Years	
104	Sex	Male.....1 Female.....2	
105	Ethnicity	Oromo.....1 Amhara2 Yem.....3 Dawro4 Gurage.....5 Kefa.....6 Tigre7 Other.....8	
106	Religion	Muslim.....1 Orthodox Christian.....2 Protestant.....3 Other4	
107	Educational status	No formal education.....1 Primary school.....2 Secondary school.....3 Higher Education.....4	
108	Occupation	Government employed.....1 Merchant.....2 Farmer.....3 House wife4 Private organization.....5	

		Student6 Other7	
109	Marital Status	Single.....1 Married.....2 Widowed.....3 Divorced.....4	
110	Monthly Income	_____	
Section Two: Information about Corneal Donation			
S.N	Questions and filters	Coding category	Skip
201	Have you ever heard about corneal donation?	Yes.....1 No.....2	
202	From where did you get this information? (please check any sources of information)	Television.....1 Radio2 Newspaper.....3 School.....4 Health care professional5 A family member or friend.....6 The internet.....7 Other.....8	
203	Do you know anyone who has had a corneal transplant?	Husband.....1 Mother.....2 Son/Daughter.....3 Sister/brother.....4 Other5	
204	Do you know anyone who is waiting for a corneal transplant?	Yes.....1 No.....2	
Section Three: Knowledge score			

301	What do you mean by eye donation?	Donation of own eye after death.1 Don't know.....2 Other3	
302	What is removed from the eye?	The whole eye.....1 Cornea only.....2 Don't know.....3	
303	Can corneal transplantation cures all causes of blindness?	Yes.....1 No.....2 Don't know.....3	
304	There is an age limit on who can donate eye?	Yes.....1 No.....2 Don't know.....3	
305	Is blood group matching necessary for corneal transplantation?	Yes.....1 No.....2 Don't know.....3	
306	Can the eye be removed from a living person for donation?	Yes.....1 No.....2 Don't know.....3	
307	Do you think that a human eye can be sold or bought?	Yes.....1 No.....2 Don't know.....3	
308	Is Eye Bank available in Ethiopia?	Yes.....1 No.....2 Don't know.....3	
309	What is ideal time for procurement of the eye after the death of donor?	Within 6hrs.....1 Within 24hrs2 After 48hrs.....3 Other4 I don't know.....5	
310	Can a person who is wearing spectacle donate his eye after	Yes.....1 No.....2	

	death?	Don't know.....3	
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Section Four: Attitude score						
S.N	Questions and filters	Coding category				
		Strongl y agree	Agree	Neutr al	Disagre e	Strongl y disagre e
401	It's against my religious beliefs					
402	Helping another human being is an honorable thing to do					
403	Corneal donation after death leaves the body mutilated and disfigured					
404	Corneal procurement significantly delays in normal funeral arrangements					
405	A deceased useful eye should not be wasted					

ANNEX 3: DECLARATION

DECLARATION

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Public Health in effect at the time of grant is forwarded as the result of this application.

Name of the student: Guteta G/Michael (MD)

Date._____ **Signature** _____

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor: Sisay Bekela (MD, Assistant Professor of Ophthalmology)

Date._____ **Signature** _____

APPROVAL OF THE SECOND ADVISOR

Name of the second advisor: Jafer Kedir (MD, Assistant Professor of Ophthalmology)

Date._____ **Signature** _____

APPROVAL OF THE THIRD ADVISOR

Name of the third advisor: Aemero Abateneh (MD, Associate Professor of Ophthalmology)

Date._____ **Signature** _____