
**“A CROSS SECTIONAL STUDY ON
KNOWLEDGE, AWARENESS AND
PERCEPTION TOWARDS ORGAN
DONATION AMONG ADULT POPULATION
IN AN URBAN AREA”**

Submitted by

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In

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**DEPARTMENT OF FORENSIC MEDICINE AND TOXICOLOGY,
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APRIL – 2022

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On this occasion of compilation of my dissertation, I take immense pleasure in conveying my gratitude and regards to all the persons, to whom I owe a lot. This accomplishment is not a result of my efforts alone but has involved a whole bunch of people either directly or indirectly.

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Date:

Dr. B. MANORANJAN.

Place: Belagavi

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LIST OF ABBREVIATIONS USED

WHO	-	World Health Organization
GODT	-	Global Observatory on Donation and Transplantation
THOA	-	Transplantation of Human Organs Act
THOTA	-	Transplantation of Human Organs and Tissues Act
NOTTO	-	National Organ and Tissue Transplant Organizations
ROTO	-	Regional Organ and Tissue Transplant Organizations
SOTTO	-	State Organ and Tissue Transplant Organizations
OD	-	Organ Donation
BD	-	Brain Death
OT	-	Organ Transplantation
IPC	-	Indian Penal Code
GKHA	-	Global Kidney Health Atlas
ESKD	-	End-stage kidney disease
UG	-	Under Graduate
PG	-	Post Graduate
PUC	-	Pre-University College
HCP	-	Health Care Professionals

ABSTRACT

TITLE: A cross sectional study on knowledge, awareness and perception towards organ donation among adult population in an urban area.

INTRODUCTION

In India per year 95 lakh deaths are recorded in that 5 lakh patients are dying while waiting for an Organ Transplantation. Some of the reason for organ scarcity are due to myths, religious misconceptions and unawareness. Factors like age, sex, socioeconomic status and literacy rate are having an impact of organ donation in the community. A report states that 1.5 lakh brain dead cases are due to road traffic accident, among that organ donation from 20% of those cases will be sufficient to fulfil the need of organs for transplantation. In India the organ donation rate is only 0.26 per 10 lakhs while in Spain it is at 35 per 10 lakhs, USA at 26 per 10 lakhs and UK at 24.4 per 10 lakhs. National organ transplantation program in India has a budget of 150 crores for 12th five-year plan for promoting deceased organ donation. Yet still India is lagging behind in organ transplantation when compared to other countries in the world. The major hurdles for organ transplantation are increase in demand versus supply gap, poor infrastructure in government hospital and poor rate of brain stem death certification. Implementation of acts, rules to develop national level policies, guidelines, protocols, creating awareness, promoting deceased organ transplantation. This study is taken up to provide the regional data regarding the awareness, knowledge and attitude towards organ donation among the non-medical college students and staff members in and around Belagavi city.

OBJECTIVES

1. To assess the awareness of adult population regarding organ donation in non-medical college students and staffs.
2. To assess the attitude of adult population regarding organ donation in non-medical college students and staffs.

MATERIALS AND METHODS

Study design: A cross sectional study

Study period: 1st January 2020 to 31st December 2020 (12 months)

Sample size: Calculated by taking prevalence of 50 % (490)

Sampling method: Random sampling method

Study population: non-medical college students and staffs in and around Belagavi city.

Inclusion Criteria:

1. Students and staff of both gender willing to participate from non-medical colleges will be enrolled in this study.
2. Adults age above 18 and below 60 years.

Exclusion criteria:

1. Subjects or their family members who have undergone or requiring transplantation.

Data Collection:

Permission was obtained from the principals of the respective colleges. A written informed consent was obtained from the study participants, after explaining the nature of the study. A pretested and pre-designed questionnaire is used to assess the awareness and attitude of the participants regarding organ donation. Questionnaire

covers the sociodemographic details regarding age, sex, course, educational qualification, religion, questions to assess their awareness and attitude regarding organ donation.

RESULTS

Among 490 participants, majority (95%) of them were in age group of 18-30 years. Majority (65%) of them were female participants. Most of participants were undergraduates (88%) and engineering students were 66%. Importance of organ donation were aware to only 58% and 53 % of the participants aware about who can be an organ donor. 83% of them aware that kidneys can be donated and 74% of them aware that eyes can be donated, but only 3% of them aware that all above mentioned organs can be donated. Participants of 78% opined that human organ can be sold. However, only 11% had adequate knowledge regarding organ donation. 68 % of them were willing to donate their own organ, 58% supported for relative's organ donation and 48% were willing to register as an organ donor. Among the 490 participants, 35% of them had positive attitude regarding organ donation.

CONCLUSION

The study shows that only 11% of the participants had adequate knowledge regarding organ donation. But 35% of the participants had positive attitude regarding organ donation.

Promoting the brain death concept to the society will have a high impact on deceased organ donation. Government has to implement programs and curriculum-based awareness across all courses on regular basis to maintain the awareness in the community.

KEY WORDS: - Awareness, Attitude, Organ Donation, Non-Medical College.

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INTRODUCTION


“After I die, if I am buried, I will rot. If I am burnt, I will become ash but if my body is donated, I will live to give life and happiness to many”- Amit Abraham.

In India per year 95 lakh deaths are recorded in that 5 lakh patients are dying while waiting for an Organ Transplantation.¹ In India every day, 15 persons are dying while waiting for transplantation.² Enrolment of name in organ transplantation waiting list means 10-30% of chance of not getting the organ for transplantation. Some of the reason for organ scarcity are due to myths, religious misconceptions and unawareness. Factors like age, sex, socioeconomic status and literacy rate are having an impact of organ donation in the community.¹ A report states that 1.5 lakh brain dead cases are due to road traffic accident, among that organ donation from 20% of those cases will be sufficient to fulfil the need of organs for transplantation.³ Another report states, 1.16 lakhs organs were transplanted in 2018 globally, in India 10,340 organs were transplanted in 2018. Globally cadaver donors were 31,294 in 2018, in India it was about 875 in the year 2018.³ In India the organ donation rate is only 0.26 per 10 lakhs while in Spain it is at 35 per 10 lakhs, USA at 26 per 10 lakhs and UK at 24.4 per 10 lakhs.⁴ So, India is lagging behind in organ transplantation when compared to other countries in the world. National organ transplantation program in India has a budget of 150 crores for 12th five-year plan for promoting deceased organ donation. Strict implementation of Transplantation of Human Organs Act (THOA) in 1994 was aimed mainly to regulate the removal, storage and transplantation of human organ only for therapeutic purposes and to truncate commercial dealings in human organs. Many rules and amendments are included in this existing act as Transplantation of Human Organs and Tissues Rules (THOTA), 2014 to this THOA

act.⁵ The major hurdles for organ transplantation are increase in demand versus supply gap, poor infrastructure in government hospital and poor rate of brain stem death certification. To overcome this problem National Organ and Tissue Transplant Organizations (NOTTO) was incorporated into THOTA in 2014, and developed national level policies, guidelines, protocols, creating awareness and promoting deceased organ transplantation.⁵ This study is taken up to provide the regional data regarding the awareness, knowledge and attitude towards organ donation among the non-medical college students and staff members in and around Belagavi city.

ANNEXURES

ANNEXURE I – ETHICAL CLEARANCE LETTER

**K.J.SOMAIYA INSTITUTE OF POSTGRADUATE MEDICAL EDUCATION AND RESEARCH**
(Formerly D. J. Somaiya)
Approved by AICTE, Govt. of India (AAC 1275/2010) Placed in Category 'A' by MHRD (2011)
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Date: 24/12/2019

To,

(REG. NO - BF0119001)

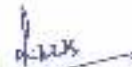
PG student in Forensic Medicine & Toxicology,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled "A CROSS SECTIONAL STUDY ON KNOWLEDGE, AWARENESS AND PERCEPTION TOWARDS ORGAN DONATION AMONG ADULT POPULATION IN AN URBAN AREA", is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.



(Dr. Anita Dalal)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.



(Dr. Kousho M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi

ANNEXURE II - INFORMED CONSENT

“A study on knowledge, awareness and perception towards organ donation among adult population in an urban area”

Investigator: _____

PG Student, Department of Forensic Medicine and Toxicology,
J.N. Medical College, KAHER, Belagavi-10.

Guide: _____

Professor, Department of Forensic Medicine and Toxicology,
J.N. Medical college, KAHER, Belagavi -10.

You are hereby requested to involve yourself in this study to assess the **knowledge, awareness and perception towards organ donation among adult population in an urban area”,** conducted by KLE hospital and medical research center, Belagavi.

Introduction:

Organ needs exceeds the organ donation. Many organ recipients are losing their life at the time of waiting, so knowing about the awareness in the general population regarding organ donation will help to increase the organ donation programs in the community. Hence the present study will be undertaken to assess the “knowledge, awareness and perception towards organ donation among adult population in an urban area.”

Methodology: - Information was collected using a pre-validated questionnaire. Knowledge and attitude of the respondents were evaluated through a questionnaire in a general population.

Inclusion Criteria:

1. Students and staff of both male and female willing to participate from non-medical science colleges will be enrolled in this study.
2. Adults age above 18 to 60 years.

Exclusion criteria:

1. People or their family members who have undergone or requiring transplantation.

Possible benefits: The investigator does not promise or guarantee you any direct benefits or services from this study. This study is going to help in detecting the “knowledge, awareness and perception towards organ donation among adult population in an urban area”

Possible risks: There are no risks involved in this study.

Cost of participation:

The cost of the study will be entirely borne by the researcher. There will be no cost to you for your participation in this study.

Legal rights:

By signing this consent form, you are not waiving off any of your legal rights.

Privacy and Confidentiality:

Your identity will not be revealed and all information collected will be coded so that, no one other than the investigator will know your identity.

Withdrawal from the study:

You can withdraw from the study at any point of time.

Authorization to publish the results:

The researcher may use the information gathered from this study for presentation or publication in scientific journals. However, your personal identity will not be revealed.

Questions:

If you still have any queries, you can contact **Dr. Roopa M Bellad** Chairperson, Institutional Ethics Committee for Human Subjects' Research, J.N. Medical College, Belagavi – 590010.

CONSENT STATEMENT

“I have been explained in my own understandable language about the contents in this form and my queries have been clarified by the investigator and I have been told that I have the right to withdraw from participating in this study at any point of time. I have been assured that confidentiality will be maintained and will be used only for this study and my identity shall never be revealed in future”.

I hereby give my consent for participation in the study “Profile of Substance abusers admitted at de-addiction centers in a city of North Karnataka” voluntarily and not under the influence of the investigator or any other influence.

Name of the participant

Signature

Name of the interviewer

Signature

Date: __/__/____

Place: _____.

Signature of the guide

ANNEXURE III-QUESTIONNAIRE

**TITLE: -“A STUDY ON KNOWLEDGE, AWARENESS AND PERCEPTION
TOWARDS ORGAN DONATION AMONG ADULT POPULATION IN AN
URBAN AREA”**

(Note: “The personal data provided by you will be kept confidential. Only aggregated results will be presented/ published”)

DECLARATION

- I] Are you willing to participate in this study? : a) YES b) NO
- II] Were you part of organ donation process for : a) YES b) NO
yourself or any of your family members or friends?

A. SOCIO DEMOGRAPHIC DETAILS:

- 1] College Name : 1) Engineering 2) Law 3) Arts & Science 4) Others
- 2] Age (in years) : 1) 18-21 2) 21-30 3) 31-40 4) >40
- 3] Education : 1) UG 2) PG 3) PUC
- 4] Sex : 1) Male 2) Female
- 5] Religion : 1) Hindu 2) Christian 3) Muslim 4) Others

B. AWARENESS:

6. Are you aware that organs can be donated to save a life of another person?
- 1) Yes 2) No 3) Don't know
7. Who can donate the organs (retrieved from the donor person)?
- 1) Healthy individuals 2) Brain dead / On life supports like ventilators
- 3) After death 4) All of the above

8. Generally, which are all the organs that can be donated?

- 1) Kidney 2) Eyes 3) Heart 4) Lungs
5) Liver 6) Skin 7) Bones 8) Pancreas

9. Is permission is required to remove/retrieve the organs?

- 1) Yes 2) No 3) Don't know

10. Who can give consent/permission in live healthy donor?

- 1) Self 2) Relatives 3) Both

11. Who can give consent/permission in brain dead and after death?

- 1) Relatives 2) Prior self 3) Both

12) Can we sell our organs?

- 1) No 2) Yes 3) Don't know

13) Does organ donation involve any health risks?

- 1) Yes 2) No 3) Don't know

14. What is your source of information regarding organ donation?

- 1) Doctor 2) TV/newspaper/radio/internet 3) friends/relatives
4) others (specify)

15. Do you know that some people die because of scarcity for donor organs?

- 1) Yes 2) No

16. Have you heard of any organisation for organ donation?

- 1) Yes 2) No

17. Are you aware of any programmes regarding organ donation?

- 1) Yes 2) No 3) Don't know

18. Is there any law for organ donation in India? If yes (specify)

- 1) Yes 2) No 3) Don't know

19. Is the Government taking any steps to promote organ donation?

- 1) Yes 2) No

C. PERCEPTION & ATTITUDE

20. What do you think, your religion supports organ donation?

- 1) Yes 2) No 3) Don't know

21. Are you willing to donate your organ after death?

- 1) Yes 2) No 3) Don't know

21a) If yes to organ donation what motivates you to donate?

1) I feel sense of self responsibility to serve the mankind (OR)

Its everybody duty to help to save the life

2) Government/voluntary agencies/doctor & media

3) Others(specify) _____

21b) If no to organ donation what is the reason for denying organ donation??

1) It's against my religion

2) I have a fear of life after death

3) Family won't agree

4) others specify _____

22. If situation so arise, would you authorize removal of organs from your family member after death?

- 1) Yes 2) No

23. People who donate organs in this life would take birth with a missing organ"

Do you believe in this?

- 1) Yes 2) No 3) Don't know

24. Do you think organ donation should be made mandatory after death?

- 1) Yes 2) No

25. I am willing to register as an organ donor

- 1) Yes 2) No 3) Don't know

ANNEXURE IV - KEY TO MASTER CHART

1] College Name : 1) Engineering 2) Law 3) Arts & Science 4) Others

2] Age (in years) : 1) 18-21 2) 21-30 3) 31-40 4) >40

3] Education : 1)PUC 2) UG 3) PG

4] Sex : 1) Male 2) Female

5] Religion : 1) Hindu 2) Christian 3) Muslim 4) Others

6. Are you aware that organs can be donated to save a life of another person?

1) Yes 2) No 3) Don't know

7. Who can donate the organs (retrieved from the donor person)?

1) Healthy individuals 2) Brain dead / On life supports like ventilators

3) After death 4) All of the above

8. Generally, which are all the organs that can be donated?

1)Kidney 2) Eyes 3) Heart 4) Lungs

5) Liver 6) Skin 7) Bones 8) Pancreas

9. Is permission is required to remove/retrieve the organs?

1) Yes 2) No 3) Don't know

10. Who can give consent/permission in live healthy donor?

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12) Can we sell our organs?

1) No 2) Yes 3) Don't know

13) Does organ donation involve any health risks?

1) Yes 2) No 3) Don't know

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- 1) Doctor 2) TV/newspaper/radio/internet 3) friends/relatives
- 4) others (specify)

15. Do you know that some people die because of waiting for donor organs?

- 1) Yes 2) No

16. Have you heard of any organisation for organ donation?

- 1) Yes 2) No

17. Are you aware of any programmes regarding organ donation?

- 1) Yes 2) No 3) Don't know

18. Is there any law for organ donation in India? If yes (specify)

- 1) Yes 2) No 3) Don't know

19. Is the Government taking any steps to promote organ donation?

- 1) Yes 2) No

20. What do you think, your religion supports organ donation?

- 1) Yes 2) No 3) Don't know

21. Are you willing to donate your organ after death?

- 1) Yes 2) No 3) Don't know

21a) If yes to organ donation what motivates you to donate?

0) Blank (no response)

1) I feel sense of self responsibility to serve the mankind (OR)

Its everybody duty to help to save the life

2) Government/voluntary agencies/doctor & media

3) Others(specify)_____

21b) If no to organ donation what is the reason for denying organ donation?

- 0) Blank (no response)
- 1) It's against my religion
- 2) I have a fear of life after death
- 3) Family won't agree
- 4) Others specify _____

22. If situation so arise, would you authorize removal of organs from your family member after death?

- 1) Yes
- 2) No

23. People who donate organs in this life would take birth with a missing organ" do you belief in this?

- 1) Yes
- 2) No
- 3) Don't know

24. Do you think organ donation should be made mandatory after death?

- 1) Yes
- 2) No

25. I am willing to register as an organ donor

- 1) Yes
- 2) No
- 3) Don't know

ANNEXURE V - MASTER CHART

S No	Course	Age Interval	Education	Sex	Religion	Organ donation can save the life	Who can be the donor	Permission required for organ retrieval	Whoes consent is needed in healthy donor ?	Whoes consent is needed in deceased donor?	Can organs be sold ?	Health risk in organ donor	Source of information	Death due to svarcity of organs	Is there any organisation for organ donation ?	Is there any programmes regarding organ donation?	Is there law for organ donation and transplantation in India?	Govt taking step to promote organ donation	Your religion supports organ donation	Willing to donate organs?	Willing to donate relatives organs?	Motivation to be a donor	Reason for denying organ donation	Mythical beliefs	Mandatory organ donation after death	Willing to register as an organ donor
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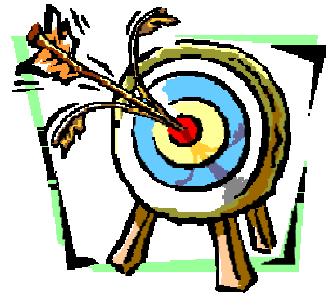
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Introduction



Objectives



Review of Literature



Methodology



Results



Discussion



Conclusion



Summary



Bibliography



Annexure-I



Annexure-II



Annexure-III



Annexure-IV

AIMS AND OBJECTIVES

1. To assess the knowledge towards organ donation among adult population in an urban area.
2. To assess the attitude towards organ donation among adult population in an urban area.

REVIEW OF LITERATURE

Definitions of Organ donation and Transplantation⁶

Human organ- any part of a human body consisting of a structured arrangement of tissues which, if wholly removed, cannot be replicated by the body.

Organ donor- any person, not less than eighteen years of age, who voluntarily authorizes the removal of any of his human organs for therapeutic purposes.

Recipient - a person into whom any human organ is, or is proposed to be, transplanted.

Organ transplantation - the grafting of any human organ from any living person or deceased person to some other living person for therapeutic purposes.

Deceased person - a person in whom permanent disappearance of all evidence of life occurs, by reason of brain-stem death or in a cardio-pulmonary sense, at any time after live birth has taken place.

Therapeutic purposes - systematic treatment of any disease or the measures to improve health according to any particular method or modality.

Brain-stem death - the stage at which all functions of the brain stem have permanently and irreversibly ceased and is so certified.

Moment of death⁷ –

According to sec 46 IPC – death denotes death of a human being unless the contrary appears from the context.

Registration of Births and Deaths Act, Sec. 2(b) defines death as permanent disappearance of all evidence of life at any time after livebirth has taken place.

There are two types of death

1. Somatic or clinical
2. Molecular or cellular

Somatic death – it is a complete and irreversible cessation of respiration, circulation and brain activities (Bishop's tripod of life). Somatic death is important to make clinical diagnosis.

Molecular death – the death of the cells and tissues separately, they lost their capacity to perform aerobic respirations and metabolic activities.

Brain-stem death⁶ - the stage at which all functions of the brain stem have permanently and irreversibly ceased and is so certified.

The main functions of brain stem are regulating the respiratory center, control eye movements, reflexes, level of consciousness, perception of pain and regulate cardiovascular system. Numerous reasons that lead to brain stem death like trauma, brain tumor, stroke, etc.

Brain dead can be assessed by many criteria Harvard, Minnesota and Philadelphia criteria are generally accepted.

Harvard criteria for determining brain stem death: ^{8,9}

- Unreceptivity and unresponsiveness – unaware and unresponsive to painful stimuli
- No movement - no muscular movements for stimuli
- No breathing (Apnea)- no spontaneous breathing for 1 hour.
- No elicitable reflexes.
- Irreversible coma- pupil fixed and dilated, not responsive to bright light.
- Flat electroencephalogram (confirmatory).

Minnesota criteria for determining brain stem death: ^{8,10}

- Known but irreplaceable intracranial tension.
- No spontaneous movements.
- Apnea.
- Absence of brain stem reflexes.

Philadelphia criteria: ^{8,11}

- Absence of responsiveness to internal and external environment.
- No spontaneous breathing for more than 3 min.
- Absence muscular movements with generalized flaccidity.
- Absence of reflexes and responses.
- Declining arterial pressure without the use of drugs or by other measures.
- Isoelectric electroencephalogram recorded spontaneously and during tactile and auditory stimulation.

Tests done to document loss of brain stem function in India: ⁸

- Pupillary or light reflex (both sides).
- Doll's head eye movement or vestibulo-ocular reflex.
- Corneal or blinking reflex (both sides).
- Gag or pharyngeal reflex.
- Cough (tracheal).
- Eye movements on caloric testing bilaterally.
- Absence of motor response in all cranial nerve distributions.
- Apnea test.

Human organs viability period: ¹²

- Lung - 4 to 6 hours
- Heart - 4 hours
- Liver - 24 hours
- Pancreas - 24 hours
- Kidney - 72 hours
- Cornea - 14 days
- Bones - 5 years
- Skin - 5 year
- Heart Valves - 10 years

Loopholes in THOA 1994 ⁵

1. Absence of authentication in brain death declaration by government and hospitals.
2. Non near relatives can donate by affection.
3. Even fake marriages were done for the purpose of organ donation.

Death is inevitable and certain in every living being. But struggle to live long has always been basic instinct of humans. Even after 2 centuries of advancements in medicine and science mankind can only postpone death or increase the life span but death is always inevitable.

Every year in India 5 lakh new cases of end organ failure is diagnosed, among that 2.6 lakh cases get registered for organ transplantation. ² Global Kidney Health Atlas (GKHA) cross-sectional survey of 160 participating countries proposed that 144 individuals per million population were suffering from End-stage kidney disease (ESKD). Globally for every 1 lakh population 19.2 person are dying due to end stage renal disease. In India chronic kidney disease is an eighth leading cause of death. The concept of transplantation was perceived by scientists long back in 600 B.C the main hindrance was transplantation immunology. After so many failures world's first successful human kidney transplantation with total body irradiation was achieved in 1958 and recipient survived for 20 years. The landmark invention and usage of "wonder drug" cyclosporine and tacrolimus in 1979 became a standard baseline immunosuppressant for recipient in organ transplantation. Only 6 years later United States performed 9000 kidney transplants with 85% good survival rate. ³

In 1989 after a world tour our prime minister late Rajiv Gandhi initiated the implement of organ transplantation and a committee was set up. They identified two problems in implementing organ transplantation, firstly concept of brain stem death and acceptance of the same is uncertain in Indian law setup. Secondly trade of human organs in which exploitation of poor by rich by trading the human organs as commodities especially kidneys. ⁴

In India the organ transplantation sees a new hurdle like organ trafficking. India is a land of diversity, richness and contradictions. Back in 1990s according to UAE surgeons ‘Bombay kidneys’ were cheaper and less safe than ‘Madras kidneys’, which means that India was one of the countries where human organs can be bought for an easy and cheap price. Strict implementation of Transplantation of Human Organs Act (THOA) in 1994 was aimed mainly to regulate the removal, storage and transplantation of human organ only for therapeutic purposes and to truncate commercial dealings in human organs. After the THOA act many rules and amendments were made to the existing act to make it stronger legally and ethically. Finally, the Ministry of Health and Family Welfare in March 27, 2014 amended Transplantation of Human Organs and Tissues Rules (THOTA), 2014 to this THOA act⁵ with inclusion of tissues, establishment of National Organ and Tissue Transplant Organization (NOTTO) followed by national registry in 2015.

The yearly data was collected from World Health Organization-Global Observatory on Donation and Transplantation (WHO-GODT) to assess the impact of establishment of NOTTO on organ donation and transplantation in India, which shows almost 2- to 3-fold rise of deceased organ donation rate from 340 in 2013 to 875 in 2018 and total number of transplants performed from 4990 in 2013 to 10,340 in 2018.¹³

However, the implementation of acts, amendments, law and legislation can only channelize a solution, but contribution of awareness and attitude of the law-abiding citizen is a vital solution to minimize the organ scarcity.

In India per year 95 lakh deaths are recorded in that 5 lakh patients are dying due to organ failure which means scarcity of organs is still a major contributor for death due to organ failure. ¹

India is in need of 2.6 lakhs solid organs every year but less than 12 thousand solid organs are transplanted combining both live and deceased organ transplantation. This means enrolment of name in organ transplantation waiting list indicates that 10-30% of chance of not getting the organ for transplantation. ¹

A country with 130 crore citizens; second largest populous country in the world, with yearly death of 95 lakh people, yet the demand of organs cannot be attained. ¹⁴

The transplantation system has two donation policy Opt-out and Opt-in policy.

Opt-out – all individual of that country/state are presumed to be a deceased organ donor unless they specifically opt-out of doing so.

Opt-in – here no one is presumed to be a deceased organ donor, the system requires the voluntary express of their preference to be a deceased organ donor. ¹⁵

Some countries like Spain, Austria, Sweden, Britain and many more developed countries following a system of presumed consent known as opt-out system to increase their organ donation rates but Indian system follows a strict democracy as per that a manual consent-based opt-in system is in the play. Despite the 1.3 billion population the opt-in system is facing an organ scarcity problem due to the lack of awareness, myths, misinterpretations, and inappropriate convictions, which thereby contribute to the lacking knowledge and attitude towards organ donation. ¹³

The major hindrance in India is awareness and attitude of an individual towards organ donation; the social and cultural factors that influence the attitude of a person. Awareness, attitude and perception plays a vital role in influencing the rates of organ donation. It's noted from studies that willingness for organ donation among medical students has increased after 6 years of medical education which is a solid proof of impact of knowledge regarding organ donation. ¹⁶

Many studies have been conducted regarding awareness towards organ donation in general population, health care providers and medical students but very few studies are available concerned to awareness of organ donation regarding non-medical college students and staffs as a community. Organ scarcity is a general problem on the whole so contribution from every citizen matters.

Right now, India is in the initial phase in accomplishing the demands in organ transplantation because in 2019, the Transplantation of Human Organs Act in India reached its silver jubilee but we are still <1 per 10 lakh in organ donation. ¹⁷ The areas to be concentrated now is creating awareness, improving the attitude of an individual and considering the brain stem death as a mandatory organ donation opt-out system.

Studies on Knowledge and attitude regarding organ donation

A cross sectional study conducted in Tamilnadu in 2012 among degree college students out of 440 participants it was observed that 29% were aware about organ donation and source of information was through media in 53% of them. Merely 14 % were aware about legislation of organ donation but 55% of the participants showed positive attitude regarding organ donation. they concluded that the attitude and

practice of the participants was not correlating and continuous media campaign for organ donation should be endorsed.¹⁸

A cross-sectional study was done in tertiary eye care center among health care professionals regarding Knowledge and attitude towards eye donation. Out of 600 participants 288 (38%) were unaware about the eye donation and the higher educational status of the person showed an impact in awareness. Merely 6% of the HCPs pledged their eye for donation and they have concluded that education and awareness towards health care professionals regarding eye donation is most important to have fruitful future.¹⁹

A community based cross-sectional study was conducted in rural areas of Faridabad in 2013. Total participants were 947 out of which 80% were aware about organ donation. Despite their awareness towards organ donation, most of them (61%) were unaware of brain death. Majority of the participants had positive attitude towards organ donation. They concluded that brain death awareness is as important as awareness of organ donation and a primary health care physician can make a strong interaction with rural public and awareness regarding brain death has to be initiated to increase the organ donation.²⁰

An interventional study was conducted in a medical college at 2014 towards 1st year medical students regarding knowledge and attitude with a pre-structured questionnaire. For all 70 participants pre-test and post-test were conducted after the classroom intervention teaching. For most of the participants (52.7%), the source of information was mass media. The post-test after intervention class showed steep increase in awareness. The post-test showed complete difference in their attitude

towards organ donation (93%). They concluded that the intervention class showed improvement in the awareness and attitude towards organ donation.²¹

A college based cross-sectional study was conducted in Hyderabad among dental students in 2014. 298 had participated; majority of them (65%) had average knowledge regarding organ donation and almost 95% showed low positive attitude regarding organ donation. They concluded that their results couldn't be generalized to whole population and awareness programs through mass media might increase the attitude of the people.²²

A cross-sectional study was done in 2015 towards the people in residential area of Ahmedabad, in that 200 adults had participated. Majority (172) of them were aware about the term organ donation and among the unaware participants, 12 of them were graduates and that was the troubled truth. Nearly half of them had a source of information through medical fraternity. Awareness regarding legislation of organ donation was only 25%. Willingness to donate organs was more in males than female in ratio of 2:1. Majority of them showed willingness to donate organs to non-smokers, Middle Aged persons, mentally and physically well individuals. They concluded that none of them had registered for organ donation and this showed a huge gap between supply and demand in organ transplantation. Awareness of the procedures, legislation of organ transplantation and organ donation and vigorous implementation of awareness program will enlighten the community was their derivative.²³

A cross-sectional study was done in a tertiary care hospital in Pune among the doctors and MBBS students in 2015. Among 532 participants, Registered Medical Practitioner were 281 and medical students were 25. Awareness of law regarding organ donation was pretty high in MBBS students than doctors. The concept of brain death

was fully aware to only 31 % of RMPs. More than 50 % of doctors had a mythical idea of misuse of organs and 62% of doctors felt that organs can be sold illegally. Only 16 % of doctors possessed organ donation card which showed the attitude of the professionals towards organ donation. They concluded that the concept of brain death and organ donation to the health care professionals had to be improved and conducting regular CMEs, including in medical curriculum would improve the attitude of preachers to practice, what they preach.¹³

A cross-sectional study was done in a tertiary care hospital in Pune in the year 2015 among the patients and attenders in the Out Patient department regarding organ and body donation. 41 of them participated among them 71% were aware of organ donation but only 29% had signed the organ donor card which reflected their positive attitude towards organ donation. They concluded that majority of people got the awareness through mass media.²⁴

A cross sectional study was conducted in Kolkata among medical college students, doctors and engineering students. Totally 300 had participated, among them majority of the participants (67%) showed their positive attitude towards cadaveric organ donation. They concluded that lack of awareness in students had to be eradicated by mass media campaign.²⁵

A community-based cross-sectional study was conducted among 360 people aged more than 18 years living in 4 villages of Puducherry. Among them, awareness of organ donation was 88% (317). Almost 70 % of them had conveyed their willingness to donate their own organs and 78% had conveyed their willingness to donate their deceased relatives' organs. Almost all the participants showed willingness to donate their eyes. They concluded that more than 85% of population

have the awareness of the importance of organ donation and more than 75% of the population showed positive attitude towards organ donation however, awareness of other organ donation was inadequate in the study population. The partial awareness regarding organ donation had to be addressed to the government so that the awareness programs in the community could enlighten the citizens.²⁶

A cross-sectional study was conducted in 2016 among the patient's attenders in outpatient department in a tertiary care center in Bangalore. 52.8% of the participants were adequately aware regarding organ donation and 67% of the participants had positive attitude towards organ donation. Among 193 participants, 147 (76.2%) supported organ donation, but only 120 (62.2%) were showed their willingness to donate organs after death. Among 193 participants almost 94% of them were aware about organ donation but only 11 (5.7%) of them had heard about the law regarding organ donation. This study concluded that public education programs to increase awareness among the general population about the legislation related to organ donation was a necessity.¹⁶

A cross-sectional study, was conducted among general population, like patient's relatives attending the OPD, people attending scientific/health exhibitions, school children, college students, and teachers who were visiting AIIMS New Delhi in 2016. Among 400 people only 352 responses were completed and included for analysis. Majority of them 94% were aware about the benefits of organ donation and 96% of participants knew the burden of organ scarcity in India. Almost 82% of participants had positive attitude of donating their own organs after brain death. The literacy rate (86%) in the study participants was a striking feature concerned to their awareness and attitude regarding organ donation. Major reason for lack of organ

donation in India was suggested in this study as lack of awareness (80.1%); religious beliefs and superstitions (63.4%); and lack of faith in the health care system (40.3%). They concluded that even though the concept of brain death is puzzling for the lay person, in the study majority of them showed positive attitude towards organ donation.²⁷

A cross sectional descriptive study was conducted in general population in Delhi in 2016. 450 of them participated, among them 261(58%) showed positive attitude towards organ donation; most of them 337(75%) were aware about organ donation. They concluded that level of awareness is not reflecting in attitude of the participants. Communication towards people regarding organ donation had to be improved from the government workforce.²⁸

A cross-sectional study was conducted among 375 undergraduates of medical and 245 undergraduate of nursing students of 4 academic years in a government tertiary care hospital, Puducherry in the year 2017 with a total of 620 participants. While comparing the knowledge and perception, median score of organ donation among Undergraduates of MBBS and Nursing students, the MBBS students had a slight upper hand median score of 16 (14-17) and nursing students had a slight lower median score of 14 (12-16). Despite the slight knowledge variability, a median score on attitude was similar in both medical and nursing students of 25 (23–28) and 25 (22–27), respectively. They concluded that regarding law for organ donation and brain death, the awareness level was adequate in less than half of the participants. Despite the low awareness, the willingness to be an organ donor was high. By including the organ transplantation and donation in the medical and paramedical curriculum, there might be an increase in the awareness level and understanding of the

concept giving a better attitude towards organ donation in future health care professionals.¹

A Community-based cross-sectional study was conducted in urban areas of Puducherry among a general adult population in the year 2017. Out of 257 randomly selected participants, male constituted 43% and female 57%. Among 257 individuals 229 person had heard about organ donation but only 72(28%) had adequate knowledge about organ donation and 148 (58%) had positive attitude towards organ donation, but only 6 individuals had registered for organ donation. Regarding organ donation, for 130 people, media was the main source of information. Primarily they concluded that adequate knowledge regarding organ donation was less than one third of their study population and more than 50 % had positive attitude towards organ donation.²

A cross-sectional study was done in 169 participants of final year MBBS students of a selected college in Western Maharashtra in 2017. 87% of participants knew the possibility of occurrence of brain death in road traffic accident and 62% had an idea about legality of brain death in India. The knowledge of organ harvesting and storage was adequate in 69% of participants. Among 169 participants only 39% of them were aware about the NGOs. They concluded that awareness regarding specific areas of organ donations like registration, identification, and portal of access was found to be lagging in future doctors so they are insisted to comprise organ donation and its process in their medical curriculum to overcome the demand and supply gap, keeping the enlightenment of the future doctors of our society.²⁹

An observational questionnaire-based study on awareness of brain death declaration was conducted in a tertiary care center of Maharashtra and 158 resident's

doctors were called for participation in the year 2017. Among them, 87 took part in the study. 80 resident doctors (91.95%) correctly defined the brain death and they could distinguish the brain death from cardiac death. Among 80 resident doctors merely 11 (13%) of them were aware about the panel of physicians in diagnosing the brain death. Awareness level regarding brain death was lacking even in resident doctors, but willingness to donate the deceased relative organs was high which reflected in their positive attitude towards organ donation. They concluded that awareness and procedure following the brain death and deceased organ donation was lacking in resident doctor.³⁰

A cross-sectional study, was conducted in a medical association meet among Health Care Professionals (HCP) in a rural town in Konkan region of Maharashtra in 2018. Among 40 Health care professionals only 32 (80%) gave their consent for participation in the study. Undoubtedly 100% of HCPs were aware about organ donation as well as body donation. Despite the 100 % awareness regarding organ donation, only 56% of them were willing to be an organ donor and majority of them were willing to donate their organs only to their family members. Almost half of the participants sensed that education regarding organ donation is paramount importance. They concluded that awareness regarding organ donation is high in Health Care Professionals (HCP) but particulars of organ donation need to be educated even among health care professionals in rural area as they were not aware of brain dead and lacked understanding about the importance of organ donation.³¹

A 2-month cross-sectional study was conducted in medical college in Telangana among the interns in the year 2018. Out of 160 participants, 85% had adequate knowledge and 78% were willing to donate the organs. For most of them

source of information was internet and social network. They concluded that adequate knowledge regarding the legislation of law was paramount importance to doctors and orientation to the medicos could increase the future organ donation process.³²

A cross-sectional study, was conducted in Guwahati at 2019. Wherein 180 Undergraduate and 180 Postgraduate participated in study assessment of attitude and awareness regarding organ donation. Among 360 participants 285 (79%) were totally aware regarding organ donation process. All Undergraduates showed complete or partial awareness but 15 (8%) Postgraduates showed complete unawareness regarding organ donation. More than half of the participants were willing to be an organ donor but when compared to UGs and PGs regarding becoming an organ donor, UGs showed more interest than PGs. They concluded that despite 10 organ transplantations done annually in Guwahati medical college, the infrastructure and awareness regarding organ donation was lacking in North East Indian region.³³

A Randomized Institutional Based Survey was conducted regarding Organ and Whole-Body Donation in a private medical college in Jaipur in the year 2019. 175 medical students took part in the study. Majority of the students were aware about the organ donation. Despite the awareness, the positive attitude was lacking in MBBS students to be a donor when compared to the BDS and nursing students in the study.

They concluded that the implementation of concept-based awareness of organ transplantation was a prerogatory and negative attitudes has to be addressed to the officials for undertaking the appropriate measures.³⁴

A community based cross-sectional study was done in rural area of Maharashtra regarding awareness and attitude about organ donation in the year 2019. Totally 276 of them participated, among them 203(74%) were aware about organ and

body donation. Educational level of the participants reflects in increased awareness. For most of them the source of information was through mass media. more than one third of the study population were aware of the legal provisions of the organ donation. Almost half of the study participants had positive attitude regarding organ donation. They concluded that however mass media has showed an impact in awareness of organ donation but it had not penetrated the society regarding brain death. Village level health programs, films and posters might have a chance to increase the awareness and thus decrease the demand vs supply gap.³⁵

A cross section study conducted in several pharmacy institute in India in the year 2019. A total of 160 students participated, among them 86% had a positive attitude towards organ donation. They concluded that organ donation has to be included to the pharmacy curriculum to increase the awareness of organ donation and brain death among the students.³⁶

An interventional study was conducted in a Tertiary Care Public Hospital among health care professionals regarding Knowledge and Attitude of organ donation in the year 2021. Participants were 242 nurses and 87 resident doctors. For all 329 participants preintervention questionnaire were given trailed by educational lecture and after a week time with educational modules were given after which the post interventional questionnaire was given. Awareness level in both nurses and doctors was increased in post intervention. Attitude level shows double fold increase in nurses but very slight increase in doctors post intervention. They concluded that nurses and doctor have adequate knowledge regarding organ donation but lack in basics and practical aspect of organ donation.³⁷

A cross-sectional comparative study among two groups blood donors and nonblood donors were conducted in Tamilnadu in blood camps in the year 2021. The participants were 416 blood donor and 413 non blood donors. Totally 829 participants, among them more than 90% were aware about organ donation but most of them sensed that implementation of strict law towards organ donation was needed which reflected on their unawareness towards legislation regarding organ donation. Despite the awareness of organ donation almost all the participants were not ready to sign the organ donor card which shows a poor attitude towards organ donation.³⁸

International studies

A cross sectional study was conducted on general population regarding knowledge and attitude towards organ donation in Karachi at 2019. The participants were 395, among them only 26% were aware about organ donation and transplantation. The willingness towards organ donation was high in 75% of participants. They concluded that adequacy level of knowledge was less and the sample size was also less which cannot represent to whole population of Pakistan.³⁹

A national level cross sectional study was conducted in many regions of Morocco in the year 2018. Totally 2000 were participated, among them 1328(66.4%) were aware about organ donation and transplantation. Majority of them 62.3% were aware about the law regarding organ donation. About 51% of them were showed positive attitude toward organ donation and 91% were willing to donate organs to their closed relatives. They concluded that awareness has to be increased among the population.⁴⁰

A survey-based study was conducted in Bahrain towards medical college students and business faculty as control in the year 2017. Totally 376 students took part in the study. Among them 67% were aware about organ donation was done after death. Majority of the medical students 64% and nonmedical students 69% showed a positive attitude to donate their organs. They concluded that attitude level of medical students was poor so appropriate improvement has to be implemented in their medical curriculum to students.⁴¹

A comparative randomized survey study was conducted in Brazil in 2019 among 340 test undergraduate students and 382 control undergraduate students. Among the study participants 90% of control participants and 86% of test participants were willing to donate their organs after death. They concluded that the participants were well versed with organ donation technicality but poor judgement towards organ donation so the extensive informative campaign towards the younger generation might kindle a positive attitude towards organ donation was their conclusion.⁴²

A cross section study was conducted in Jeddah towards medical students in the year 2020. Among 113 participants, majority of them were male 94%. The source of information regarding organ donation was surprisingly 63% by health professional merely 2% were through media. More than 55% showed positive attitude towards organ donation. They concluded that the awareness level was subpar level and study samples has to be increased and generalized awareness throughout their country towards the medical professionals has to be initiated.⁴³

METHODOLOGY

Study design

A one-year cross section study was conducted to assess the awareness and attitude regarding organ donation.

Study area

The study was conducted among non-medical colleges in and around Belagavi city.

Study population

Non-medical college students and staffs in and around Belagavi city.

Study period

The study was conducted during the period from 1st January 2020 to 31st December 2020.

Inclusion Criteria:

1. Students and staff of both gender willing to participate from non-medical colleges will be enrolled in this study.
2. Adults age above 18 and below 60 years

Exclusion criteria:

1. Subjects or their family members who have undergone or requiring transplantation.

Sample size

Sample size was calculated by assuming prevalence of knowledge, awareness and perception (p) as 50% and error of 5% (10% of prevalence Sample size) using the formula

$$n = 4pq/d^2$$

Where $p = 50$

$$q = 100-p = 50$$

$d = 5\%$ error (10% of p)

$$\text{Hence } n = (4 \times 50 \times 50) / 25$$

Non responsive = 20%

$$n=490$$

Hence sample size was calculated to be 490 assuming 20% as the non-response rate among the study participants.

Sampling method

More than 20 non-medical college are there in Belagavi city. 10 non-medical college were randomly selected and 100 student and staff members from each non-medical college were randomly selected.

Data Collection:

All the study participants were explained about the study, and they were also assured that, their identity would be kept strictly confidential and that they have the option to withdraw at any time from participation in the study.

Permission letter to conduct the study among non-medical college student and staff members was obtained from the principals of the respective college.

A pre validated questionnaire was collected from the participants after obtaining consent the informed consent form, which explained about the objectives of the study, legal rights of participation, privacy and confidentiality of their details and right to withdraw from the study which are enclosed in Annexure II.

The questionnaire comprised three sections, including sociodemographic details, awareness and attitude of the participants regarding organ donation as mentioned in Annexures III.

Data analysis:

Data collected using the questionnaire were coded and entered in to Microsoft Excel. Data management was done in Microsoft Excel. Descriptive data is expressed in percentages and frequencies. Tables and charts are prepared.

ETHICAL CLEARANCE

Ethical clearance was obtained from Institutional Ethical Committee, J.N. medical college, KAHER, Belagavi. The ethical committee clearance letter has been attached in Annexure I.

RESULTS

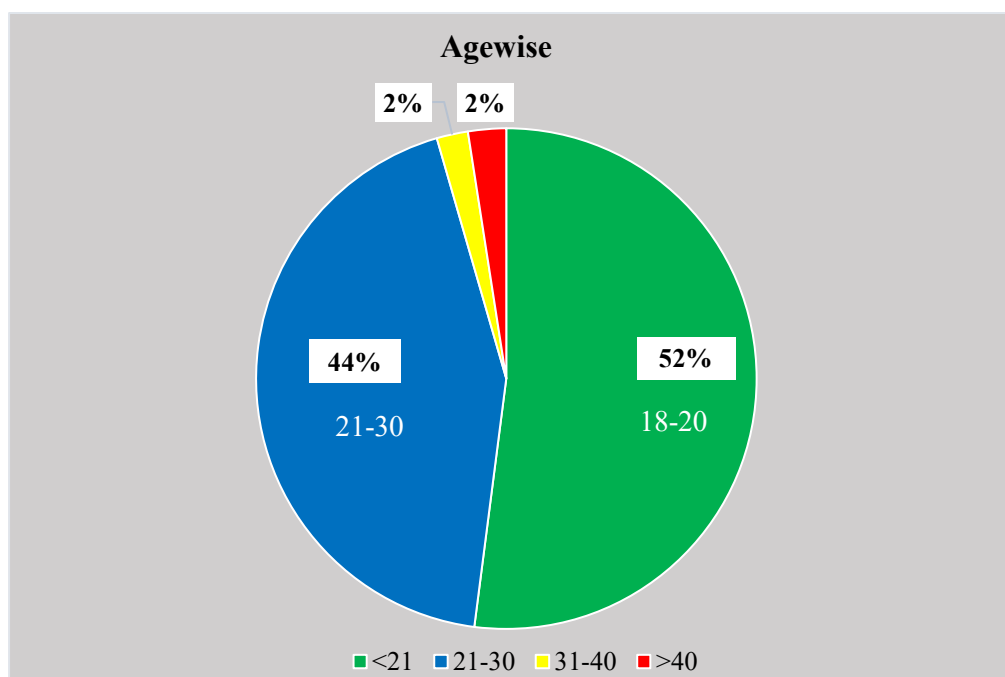
The present study titled “A cross sectional study on knowledge, awareness and perception towards organ donation among adult population in an urban area” was a survey-based study conducted among the non-medical college students and staff members in and around Belagavi city to assess the awareness and attitude regarding organ donation.

Around 10 non-medical colleges were considered, in which students and staff members were contacted for the purpose of the survey.

Only 580 participants had given consent to take part in the study. Among them, 90 participants were excluded as they had already been part of organ transplantation process in their past. Finally, 490 individuals were included in the study.

Table 1: Distribution of study participants according to age(n=490).

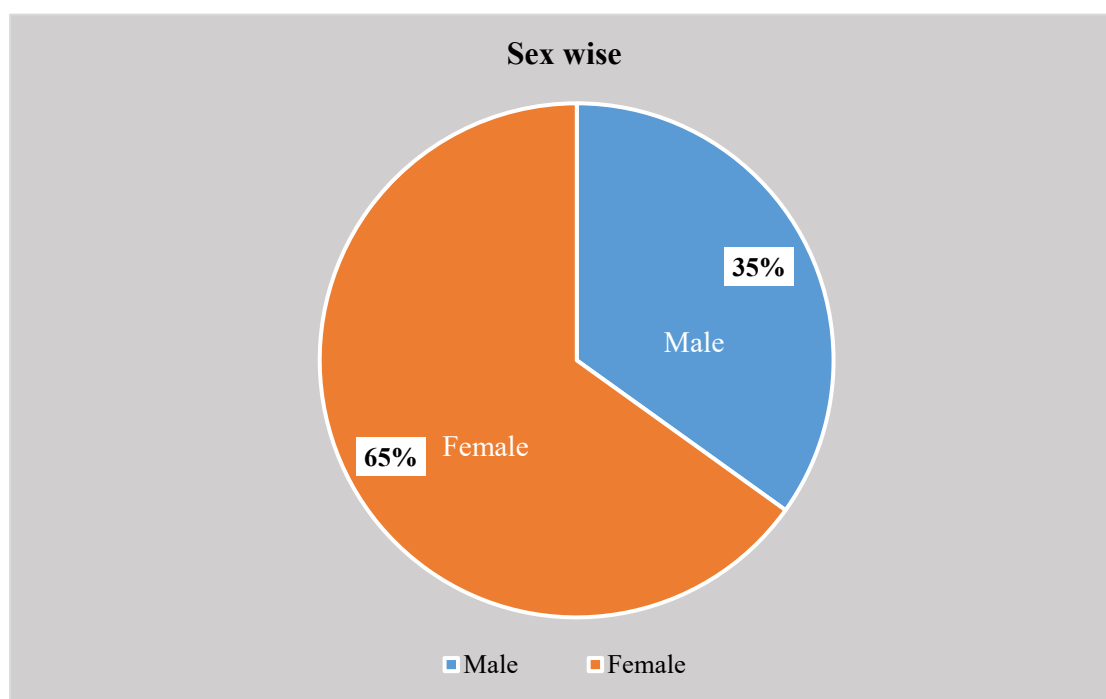
Age in years	Frequency	Percentage (%)
<21	255	52
21-30	213	44
31-40	10	2
>40	12	2
Total	490	100

Graph 1: Graphical representation of study participants according to age.

Among the 490 participants, 468 (96%) of them were in the age group of 18-30 years, followed by >40 years old individuals were 2% and 30-40 years old individuals were also 2% as shown in Table 1 and Graph 1.

Table 2: Distribution of study participants according to sex (n=490).

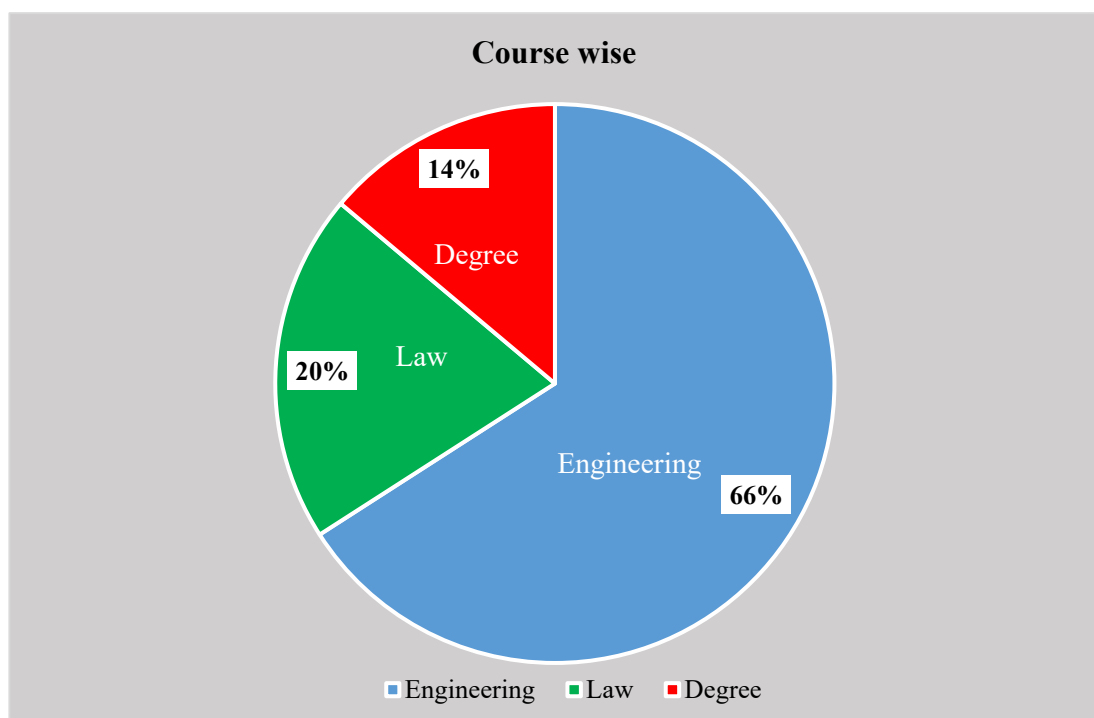
Sex	Frequency	Percentage
Male	171	35
Female	319	65
Total	490	100

Graph 2: Graphical representation of study participants according to sex.

Among the 490 participants, males were 171(35%) and females were 319 (65%) hence in our study, male and female ratio of the study participants was 1:2 as shown in Table 2 and Graph 2.

Table 3: Distribution of study participants according to course (n=490).

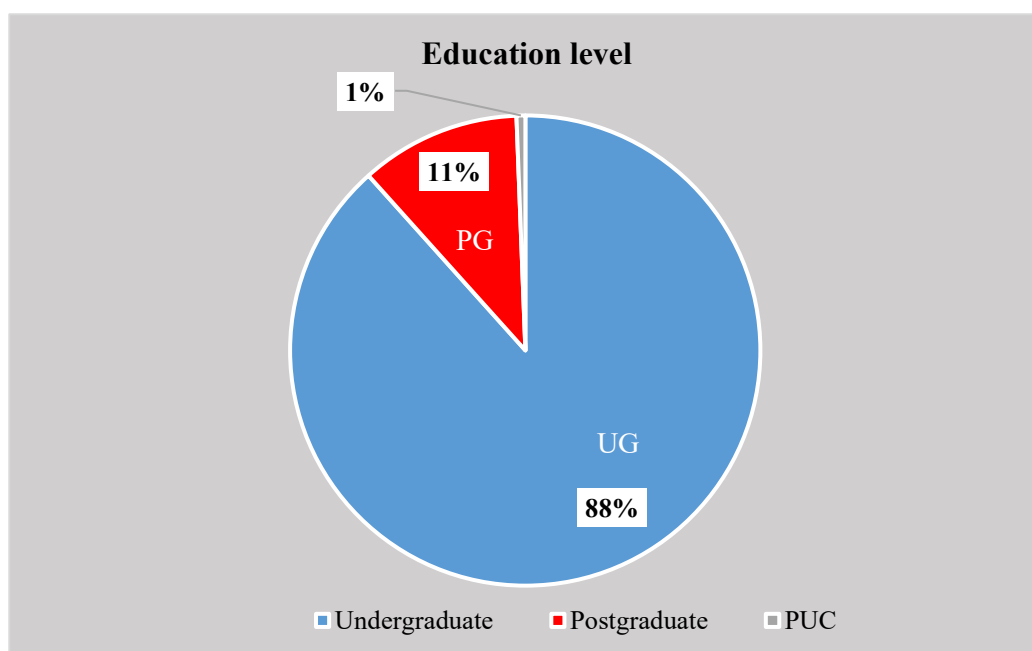
Course	Frequency	Percentage
Engineering	323	66
Law	99	20
Degree	68	14
Total	490	100

Graph 3 : Graphical representation of study participants according to course.

Among the 490 participants, majority of them were in engineering course amounting to 323 (66%) individuals followed by law and degree course participants amounting to 20% and 14 % respectively as shown in Table 3 and Graph 3.

Table 4: Distribution of study participants according to education level (n=490).

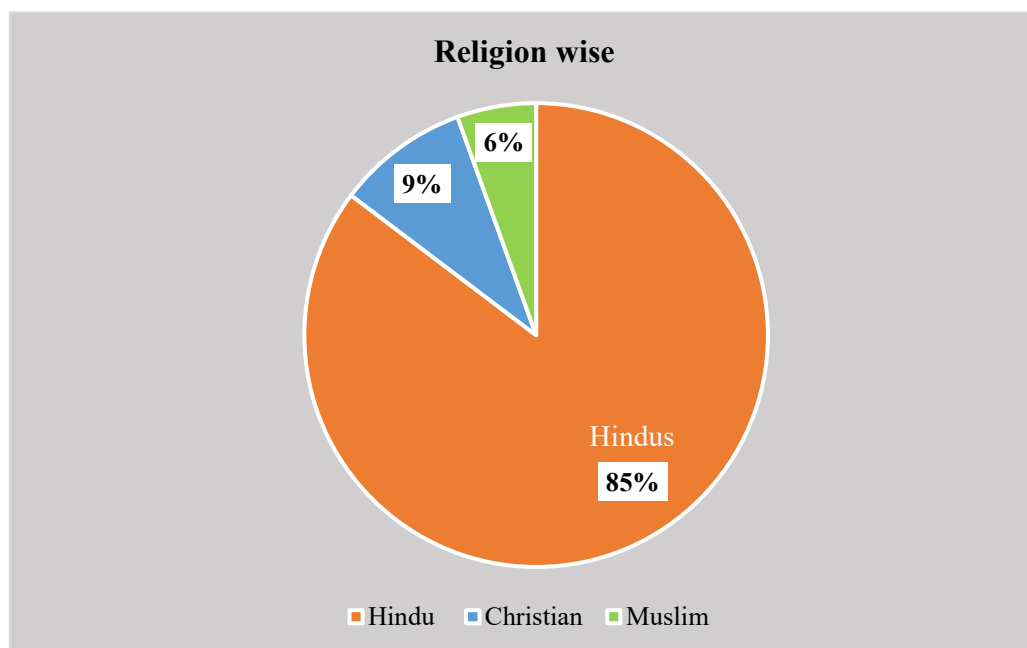
Education	Frequency	Percentage
Undergraduate	433	88
Postgraduate	54	11
PUC	3	1
Total	490	100

Graph 4 : Graphical representation of study participants according to education level.

Among 490 participants, 433 (88%) of them were undergraduates, 54(11%) of them were postgraduates and 3 (1%) of them were completed PUC as shown in Table 4 and Graph 4.

Table 5: Distribution of study participants according to religion (n=490).

Religion	Frequency	Percentage
Hindu	418	85
Christian	45	9
Muslim	27	6
Total	490	100

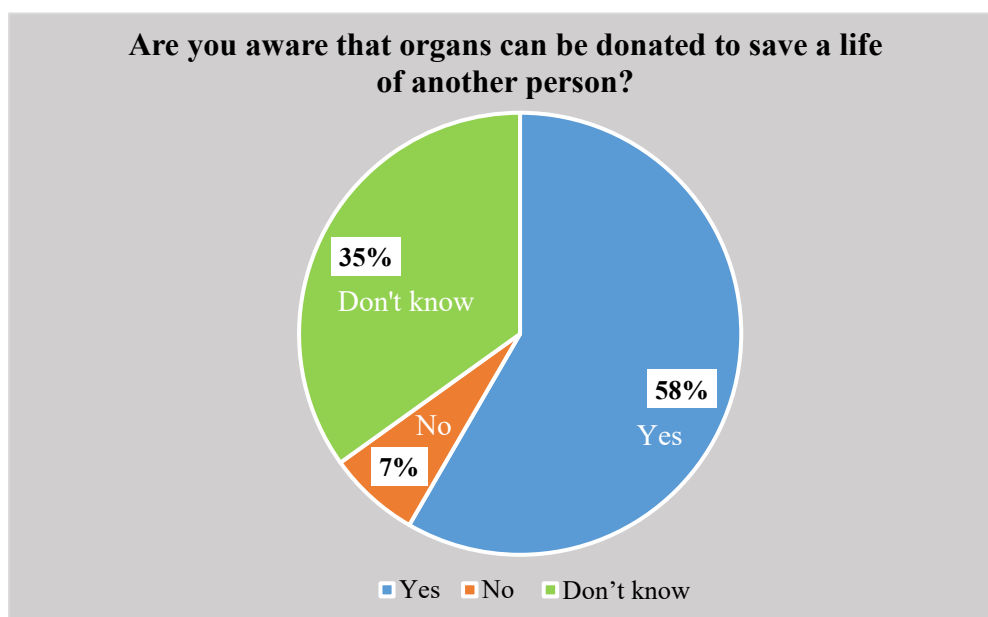
Graph 5 : Graphical representation of study participants according to religion.

Out of 490 participants, majority of them were Hindus amounting to 418 (85%) followed by Christians (9%) and Muslims (6%) as shown in Table 5 and Graph 5.

Table 6: Distribution of study participants regarding awareness, whether organ donation saves life of another person (n=490).

Organ donation saves life	Frequency	Percentage
Yes	286	58
No	33	7
Don't know	171	35
Total	490	100

Graph 6: Graphical representation of study participants regarding awareness, whether organ donation saves life of another person.

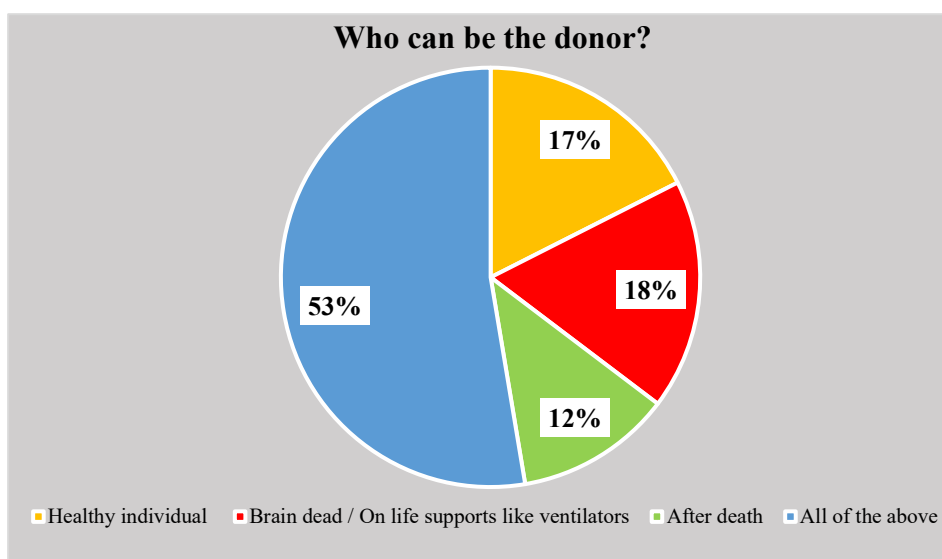


Among the study population, 286 (58%) of them were aware that organ donation saves life of another person and remaining 171 (42%) of them were not aware that organ donation saves life of another person as shown in Table 6 and Graph 6.

Table 7: Distribution of study participants regarding the awareness of who can donate organs (n=490).

Who can be a donor	Frequency	Percentage
Healthy individual	86	17
Brain dead / On life supports like ventilators	87	18
After death	59	12
All of the above	258	53
Total	490	100

Graph 7: Graphical representation of study participants regarding the awareness of who can donate organs.

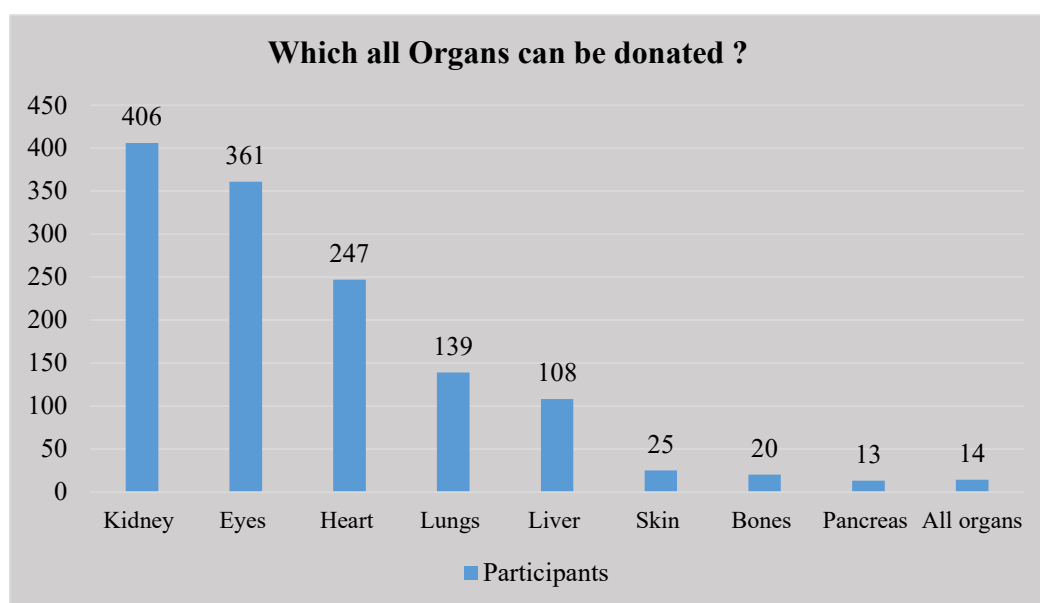


Out of 490 participants, 258 (53%) of them were aware that healthy individuals, brain dead and deceased individual can be an organ donor. 87(18%) of them opined that brain dead individuals can only donate, 86(17%) of them opined that healthy individual can only donate and 59(12%) of them opined that only deceased person can be an organ donor. This shows that remaining 48% of them were not aware about who can be an organ donor as shown in Table 7 and Graph 7.

Table 8: Distribution of study participants regarding which all organs can be donated (n=490).

Organs can be donated	Frequency	Percentage
Kidney	406	83
Eyes	361	74
Heart	247	50
Lungs	139	28
Liver	108	22
Skin	25	5
Bones	20	4
Pancreas	13	3
All the above	14	3

Graph 8 : Graphical representation of which all organs can be donated.

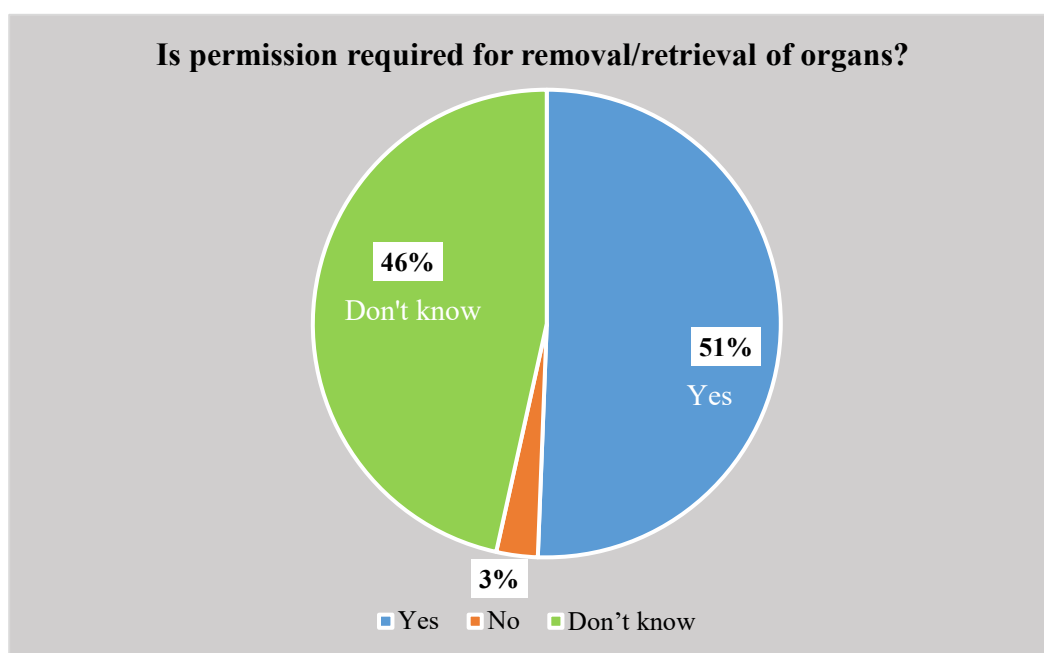


In the total of 490 participants, 83% of them were aware that kidneys can be donated and 74% of them were aware that eyes can be donated. Only 14 (3%) of the population in the study were aware that all the above listed organs can be donated as shown in Table 8 and Graph 8.

Table 9: Distribution of study participants regarding permission for organ retrieval (n=490).

Is Permission required for organ retrieval	Frequency	Percentage
Yes	248	51
No	14	3
Don't know	228	46
Total	490	100

Graph 9: Graphical representation of permission for organ retrieval.

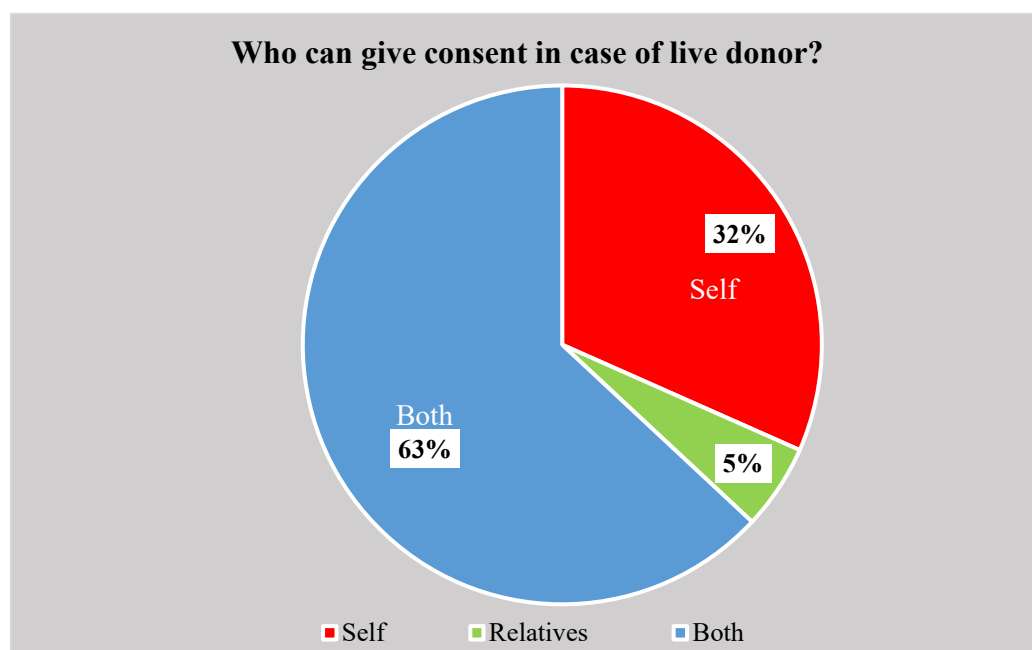


Among the study population, 248(51%) of them were aware that permission is required in organ retrieval for organ donation, remaining 49% of them were unaware that consent has to be obtained for organ retrieval as shown in Table 9 and Graph 9.

Table 10: Distribution of study participants regarding who can give consent in case of live donor (n=490).

Consent in case of live donor	Frequency	Percentage
Self	155	32
Relatives	26	5
Both	309	63
Total	490	100

Graph 10: Graphical representation on consent in case of live donor.

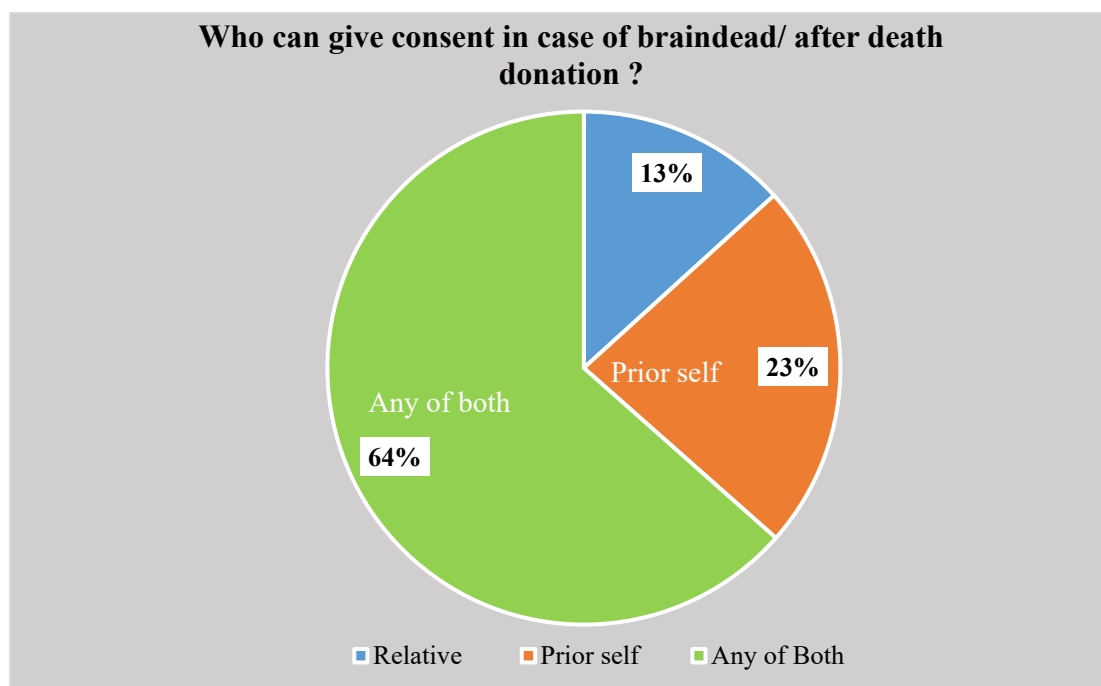


In the total of 490 participants, only 155 (32%) of them were aware that donor's (self) consent is mandatory in case of live donation and the remaining 335(68%) of them were unaware about the mandatory self-consent in case of live donor as shown in Table 10 and Graph 10.

Table 11: Distribution of study participants regarding who can give consent in deceased/brain dead donor? (n=490).

Consent	Frequency	Percentage
Relative	65	13
Prior self	114	23
Any of Both	311	64
Total	490	100

Graph 11: Graphical representation on study participants regarding consent in deceased/brain dead donor.

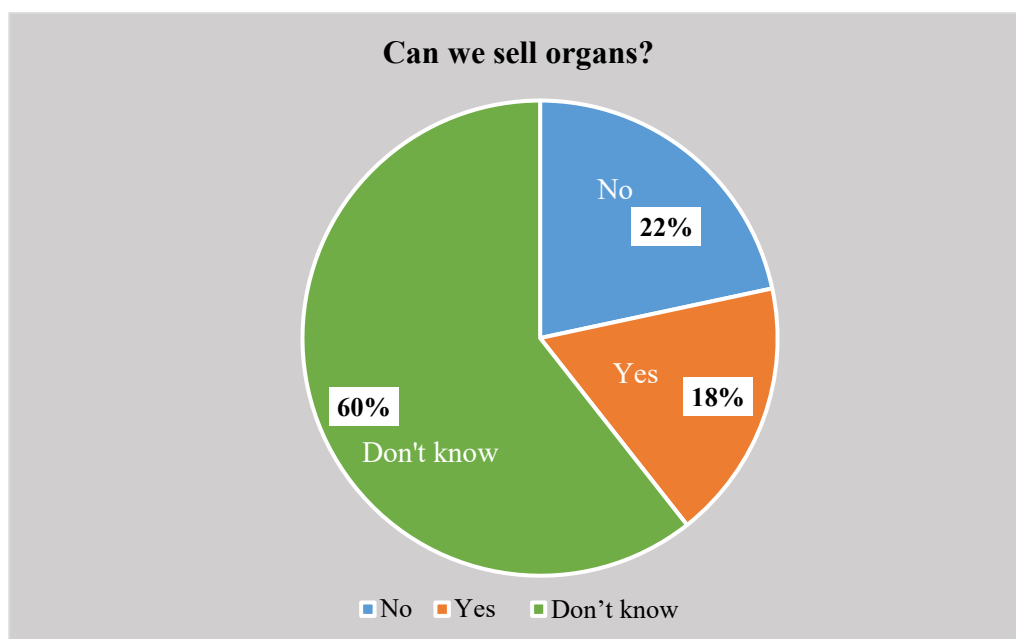


Out of 490 participants, 311(64%) of them opined that any one among i.e, self-prior or relative's consent is sufficient in case of deceased/braindead organ donation, remaining 179 (36%) of them were not aware about the consent regarding deceased/braindead donor as shown in Table 11 and Graph 11.

Table 12: Distribution of study participants regarding selling of human organs (n=490).

Can we sell our organs	Frequency	Percentage
No	106	22
Yes	87	18
Don't know	297	60
Total	490	100

Graph 12 : Graphical representation of study participants regarding selling of human organs.

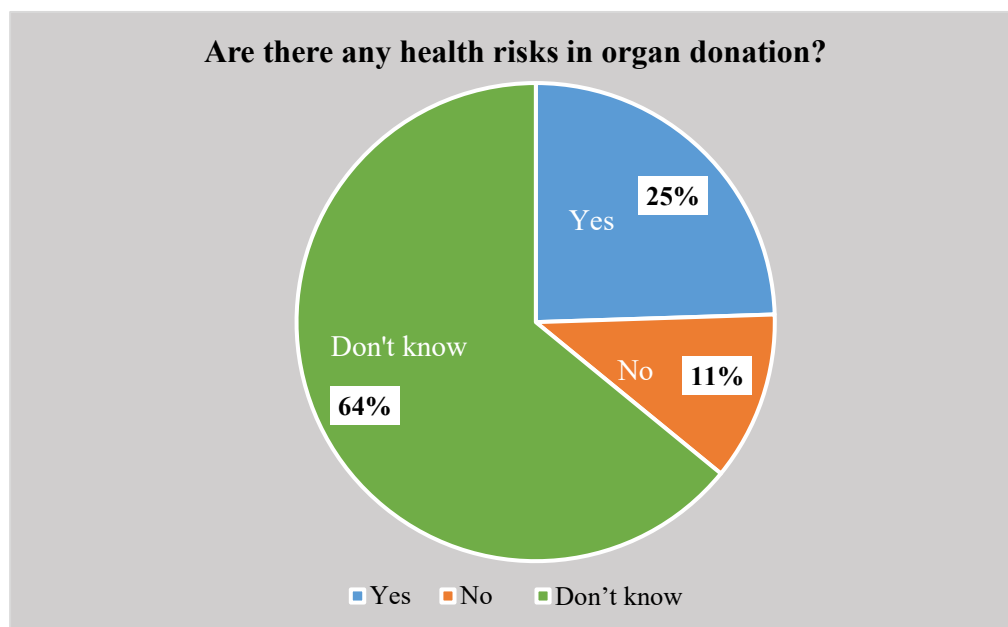


Among the 490-study population, majority of them (78%) opined that organ can be sold, but only 106(22%) of them knew that organ cannot be sold as shown in Table 12 and Graph 12.

Table 13: Distribution of study participants whether organ donation involves health risks (n=490).

Risk in organ donation	Frequency	Percentage
Yes	120	25
No	56	11
Don't know	314	64
Total	490	100

Graph 13: Graphical representation on whether organ donation involves health risks.

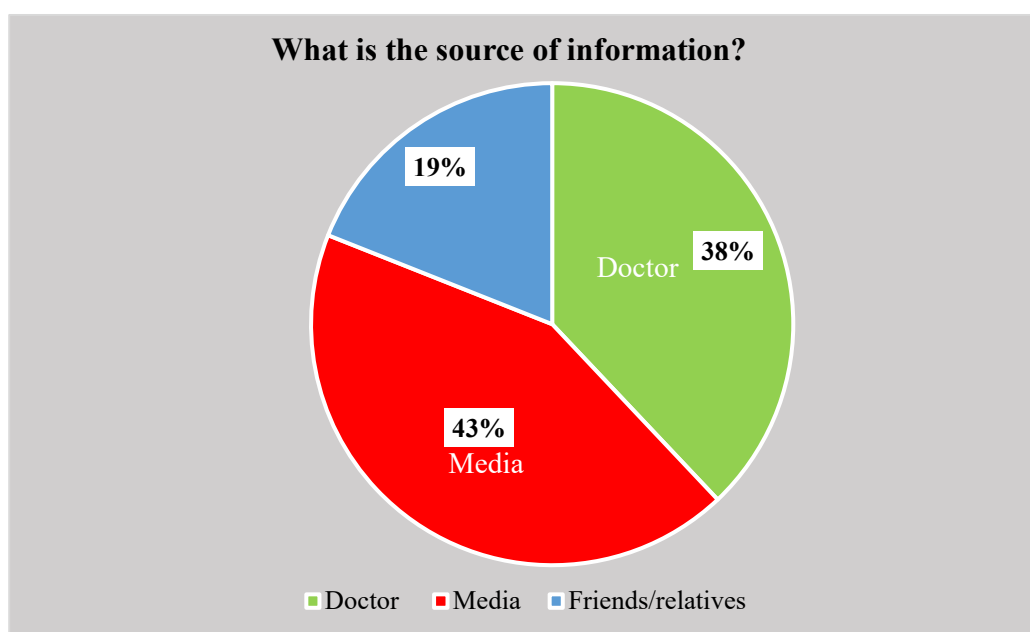


Among the 490-study population, 120(25%) of them were aware about the health risks in donation of the organ and the remaining 370 (75%) of them were not aware about the health risks in organ donation as shown in Table 13 and Graph 13.

Table 14: Distribution of study participants according to source of information regarding organ donation (n=490).

Source of information	Frequency	Percentage
Doctor	186	38
Media	211	43
Friends/relatives	93	19
Total	490	100

Graph 14: Graphical representation on study participants according to source of information regarding organ donation.

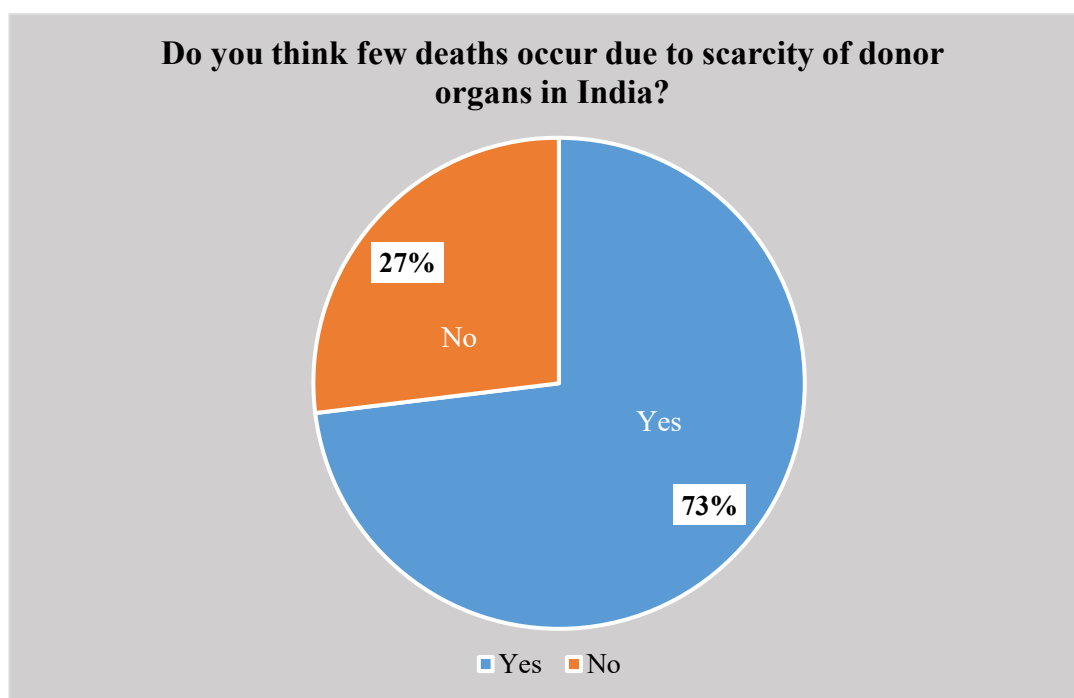


Major source of information among study population was through media amounting to 211 (43%) individuals opting for it, while only 186 (38%) of them opted that their source of information was through the health care system and the remaining 19% of the participants opted their source of information as friends/relative as shown in Table 14 and Graph 14.

Table 15: Distribution of study participants on awareness regarding death due to scarcity in organ availability (n=490).

Do deaths occur due to scarcity of donor organs	Frequency	Percentage
Yes	358	73
No	132	27
Total	490	100

Graph 15: Graphical representation on awareness regarding death due to scarcity in organ availability.

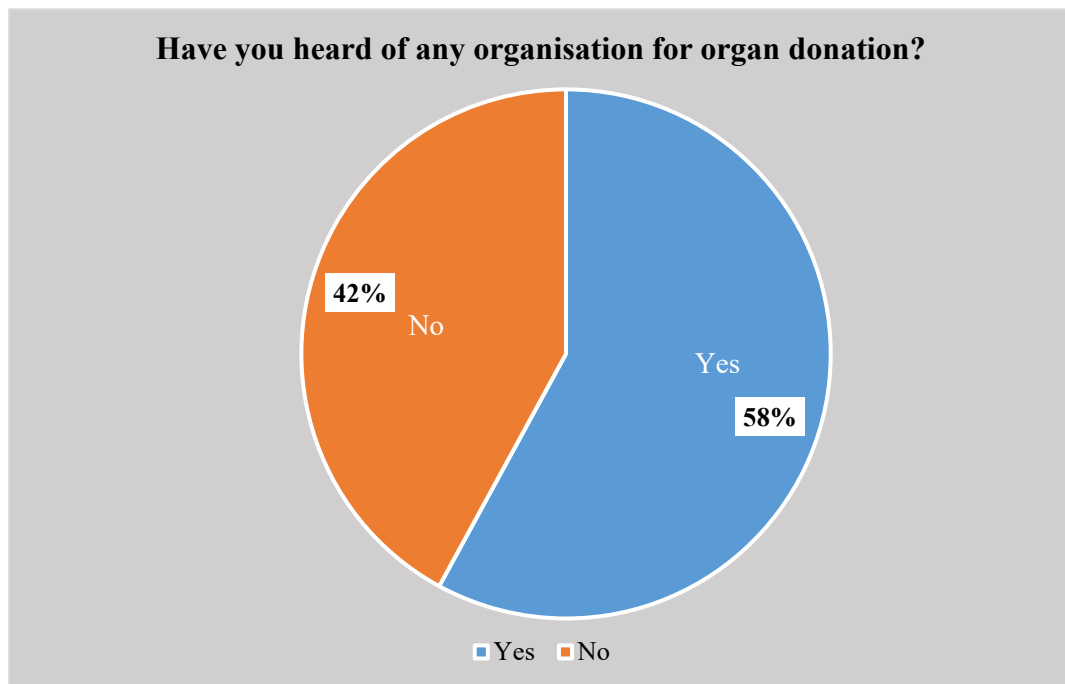


Out of 490 participants, 358 (73%) of them knew that death occurs due to scarcity in organ availability and remaining 27% were unaware regarding the death due to scarcity in organ availability as shown in Table 15 and Graph 15.

Table 16: Distribution of study participants of knowledge on organisation for organ donation (n =490).

Organisation for organ donation	Frequency	Percentage
Yes	284	58
No	206	42
Total	490	100

Graph 16: Graphical representation of knowledge on organisation for organ donation.

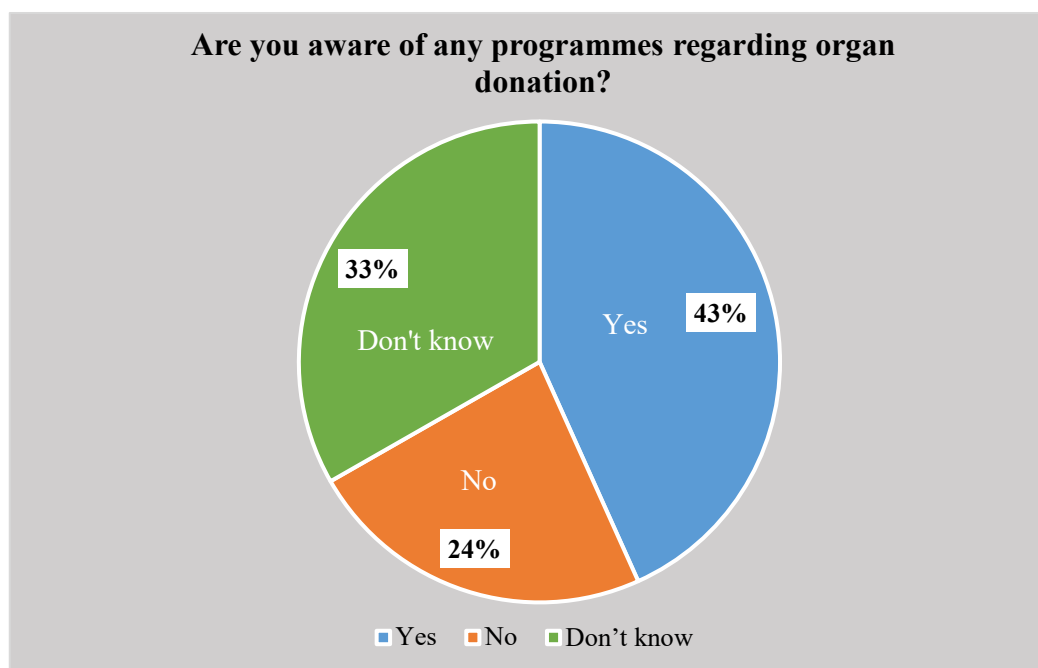


Among the study participants, more than half of them amounting to 284 (58%) were aware about the organisation for organ donation and the remaining 206 (42%) were unaware as shown in Table 16 and Graph 16.

Table 17 : Distribution of study participants according to awareness of programs regarding organ donation (n=490).

Program	Frequency	Percentage
Yes	212	43
No	115	24
Don't know	163	33
Total	490	100

Graph 17: Graphical representation of study participants according to awareness of programs regarding organ donation.

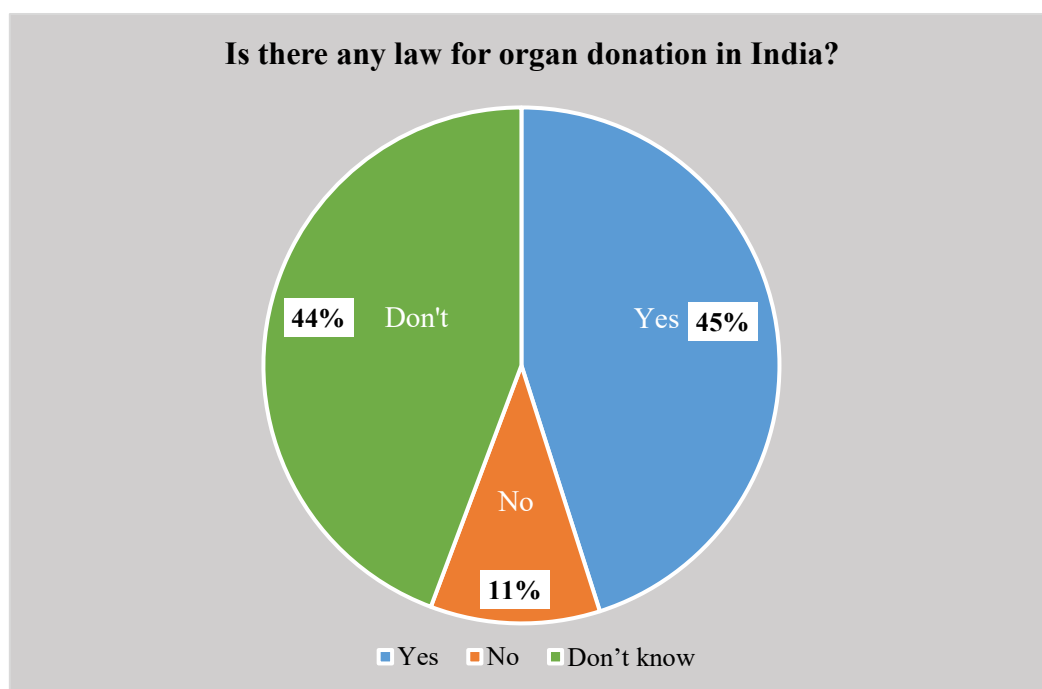


Among the study population, 212(43%) of them were aware about the program regarding organ donation and remaining 278(57%) of them were unaware about the programs that were being conducted by government and NGOs as shown in Table 17 and Graph 17.

Table 18: Distribution of study participants according to knowledge on law for organ donation (n=490).

Law for organ donation	Frequency	Percentage
Yes	221	45
No	52	11
Don't know	217	44
Total	490	100

Graph 18 : Graphical representation of knowledge on law for organ donation.

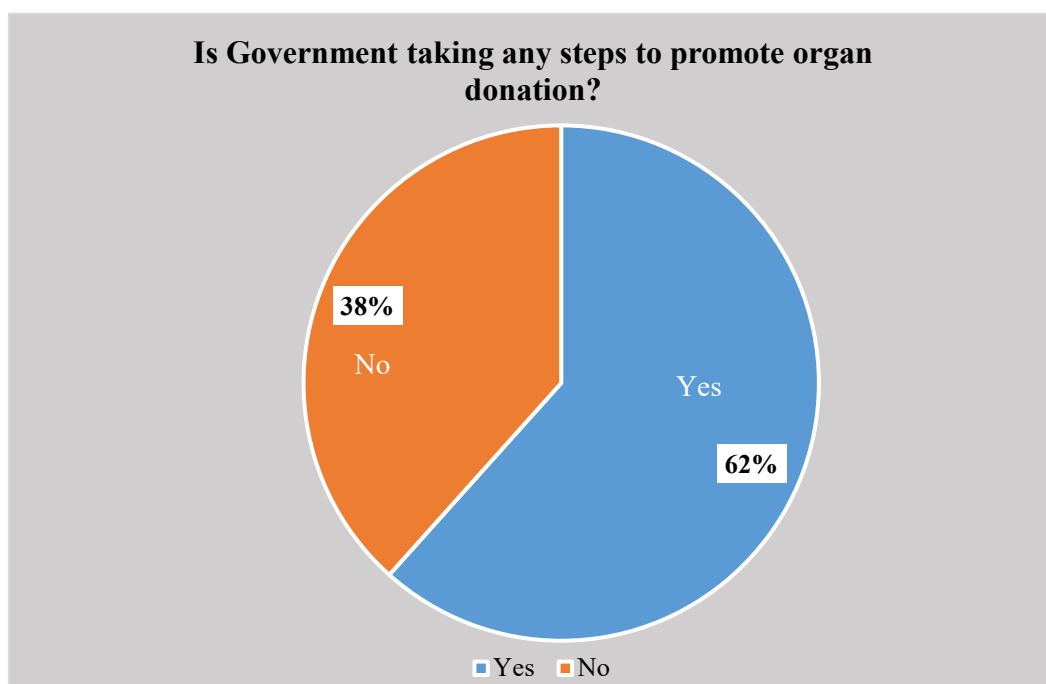


Among the study participants, 269 (45%) of them had knowledge about the law for organ donation. General knowledge of law regarding organ donation were absent in 55% of study participants as shown in Table 18 and Graph 18.

Table 19: Distribution of study participants according to awareness of steps taken by government to promote organ donation (n=490).

Is Government taking initiatives to promote organ donation	Frequency	Percentage
Yes	302	62
No	188	38
Total	490	100

Graph 19 : Graphical representation on awareness of steps taken by government to promote organ donation.



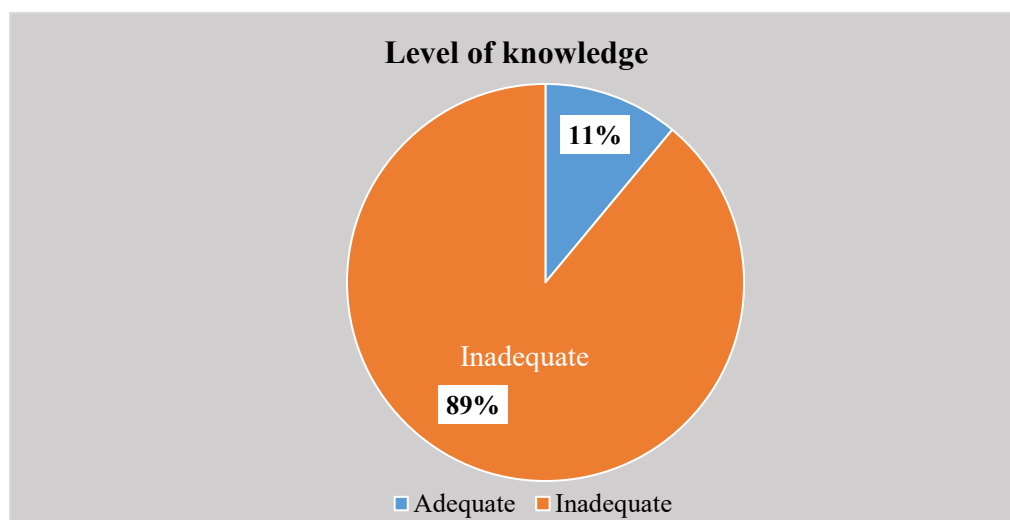
Majority of the study population amounting to 302(62%) opined that, promotion of organ donation was carried out by government, but the remaining 38% of them were unaware regarding promotion of organ donation as shown in Table 19 and Graph 19.

Table 20: Distribution of study participants according to overall Knowledge regarding organ donation based on four important questions (depicting level of adequate knowledge) (n=490).

Knowledge about organ donation	Adequate	54 (11%)
	Inadequate	436 (89%)

In our study, 58% of the participants were aware that organ donation saves life, 51% of them were aware that permission is required in organ retrieval, 22% opined that organs cannot be sold and 45% of them were aware about the existence of law for organ donation. Participants those who have answered all the above important questions correctly were considered to be having adequate knowledge regarding organ donation.

Graph 20: Graphical representation of study participants regarding adequate and inadequate knowledge.

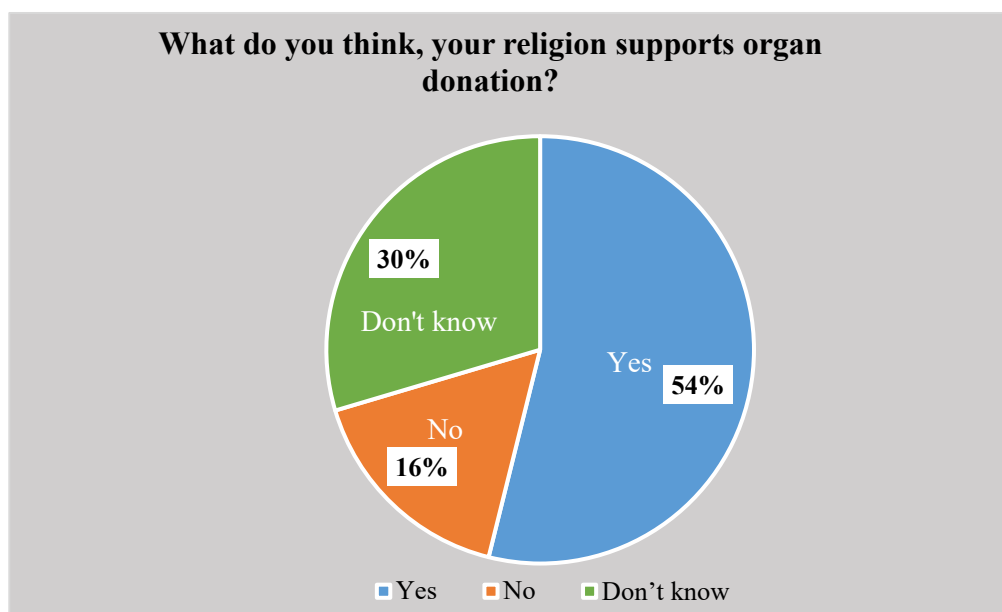


Among the total participants, only 54 (11%) of them had adequate knowledge regarding organ donation, remaining 436 (89%) of them had inadequate knowledge as shown in Table 20 and Graph 20.

Table 21: Distribution of study participants on whether their religion supports organ donation (n=490).

Your religion supports organ donation	Frequency	Percentage
Yes	264	54
No	81	16
Don't know	145	30
Total	490	100

Graph 21: Graphical representation on whether their religion supports organ donation.

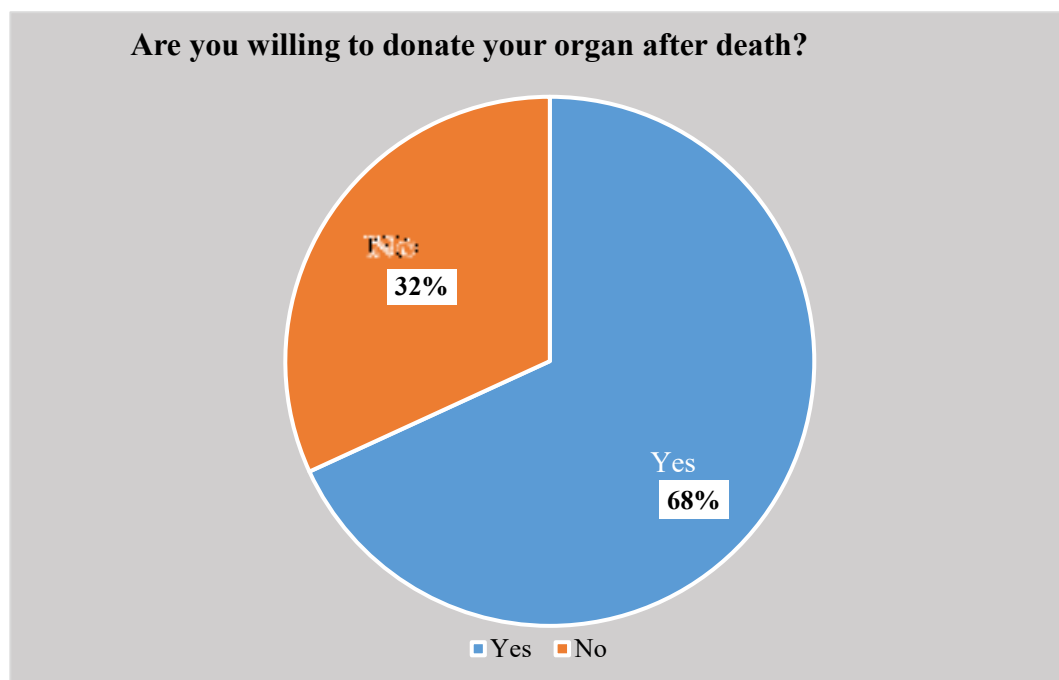


Among the 490 participants, 264 (54%) of them expressed that their religion supports organ donation, followed by 81 (16%) of them expressed that their religion doesn't support organ donation and 145 (30%) of them did not know whether their religion supports or does not support organ donation as shown in Table 21 and Graph 21.

Table 22: Distribution of study participants according to their willingness for organ donation after death (n=490).

Willingness	Frequency	Percentage
Yes	334	68
No	156	32
Total	490	100

Graph 22: Graphical representation of their willingness for organ donation after death.

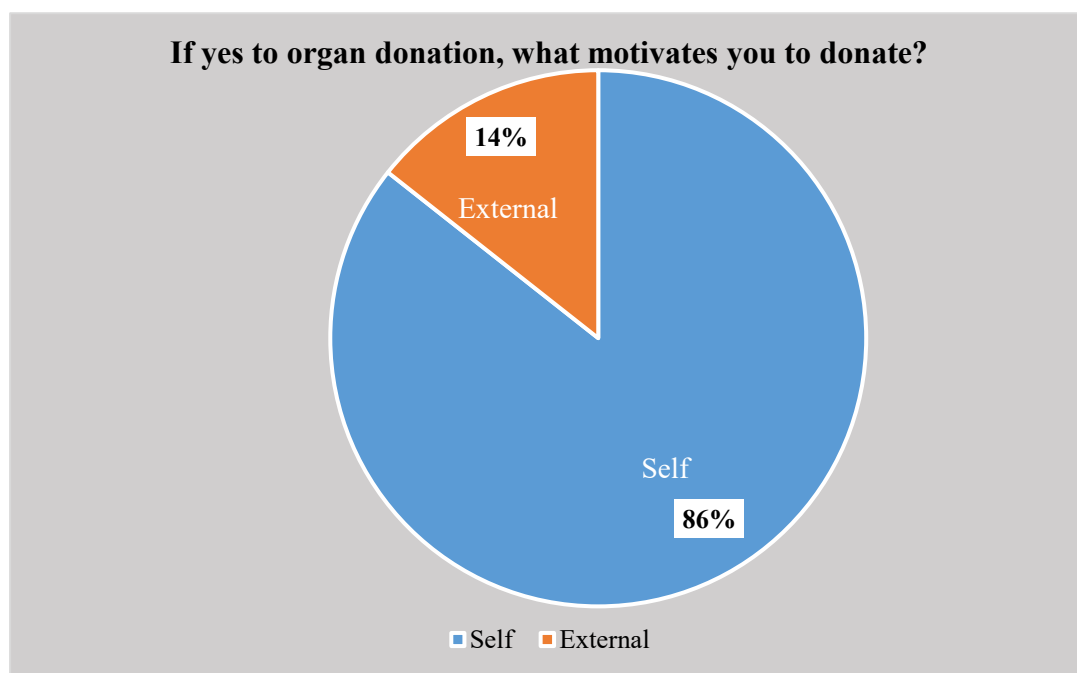


Among the 490 participants, 334 (68%) of them expressed their willingness to donate organs and remaining 156(32%) of them were not willing to be an organ donor as shown in Table 22 and Graph 22.

Table 23: Distribution of study participants what is the motivating reason among who are willing to donate organs (n=334).

Motivation factor	Frequency	Percentage
Self	286	86
External	48	14
Total	334	100

Graph 23: Graphical representation on what is the motivating reason among who are willing to donate organs.

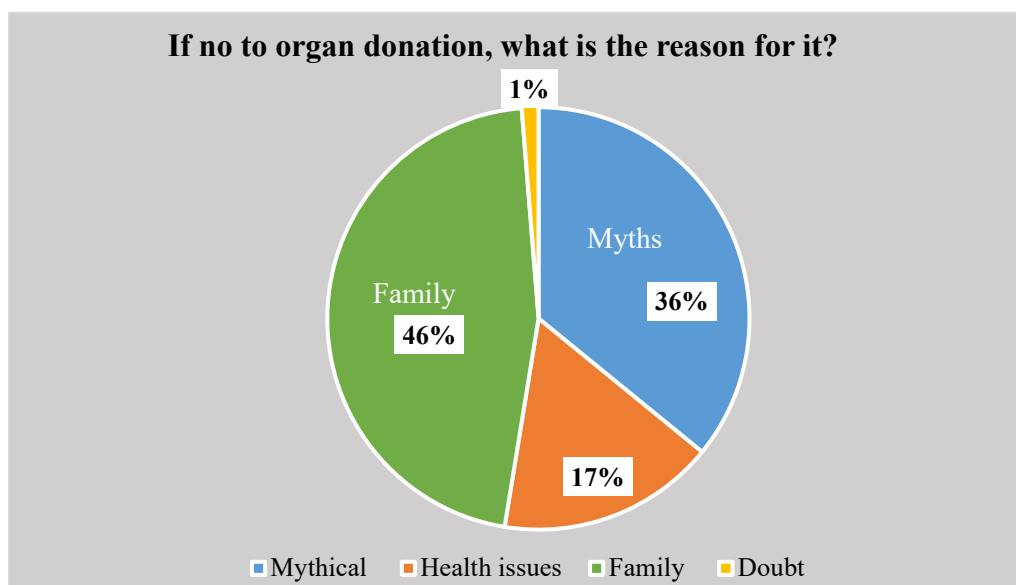


Among 334 participants who were willing to donate organs, most of them about 286 (86%) individuals were self-motivated. According to them, the reason being that organ donation is a responsibility of every citizen. Whereas 48(14%) of them were motivated by the external programs conducted by NGOs and health care unit as shown in Table 23 and Graph 23.

Table 24: Distribution of study participants according to non-willingness for organ donation (n=154).

Reason	Frequency	Percentage
Mythical	56	36
Health issues	26	17
Family	72	46
Doubt	2	1
Total	154	100

Graph 24: Graphical representation of reason for non-willing to donate organs.

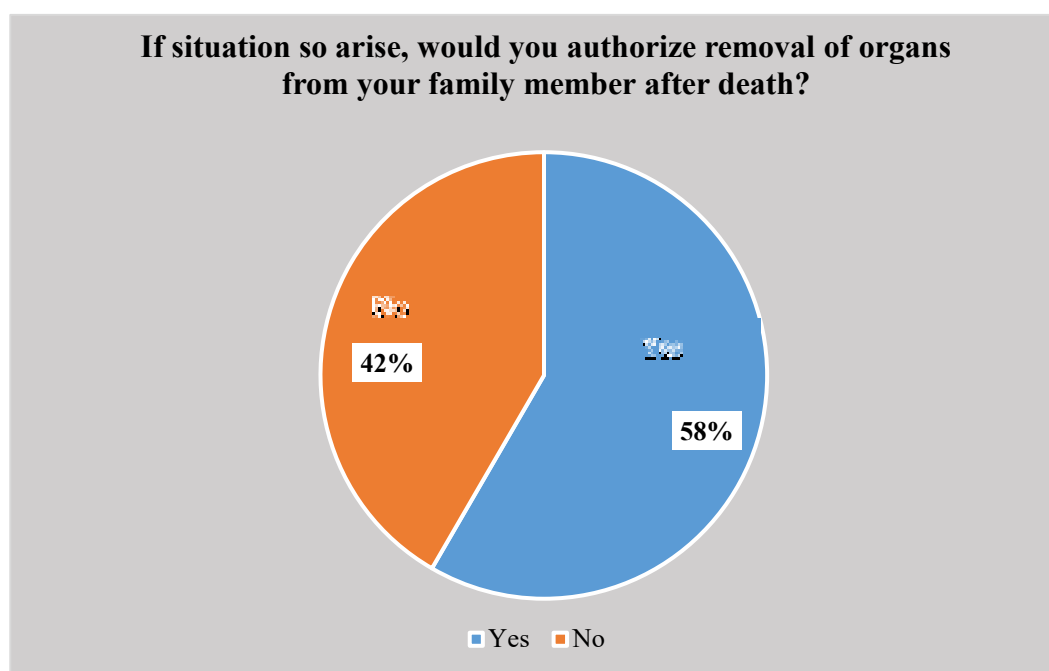


Among 154 participants who were non willing for organ donation, 72 (46%) of them gave the reason that their family members won't allow for organ donation, 56 (36%) of them gave mythical reasons, followed by 26 (17%) of them gave health issues as their reason for non-willingness to donate organs as shown in Table 24 and Graph 24.

Table 25: Distribution of study participants according whether they would approve the organ donation of a deceased relatives (n=490).

Relative	Frequency	Percentage
Yes	286	58
No	204	42
Total	490	100

Graph 25: Graphical representation of study participants according whether they would approve the organ donation of a deceased relatives.

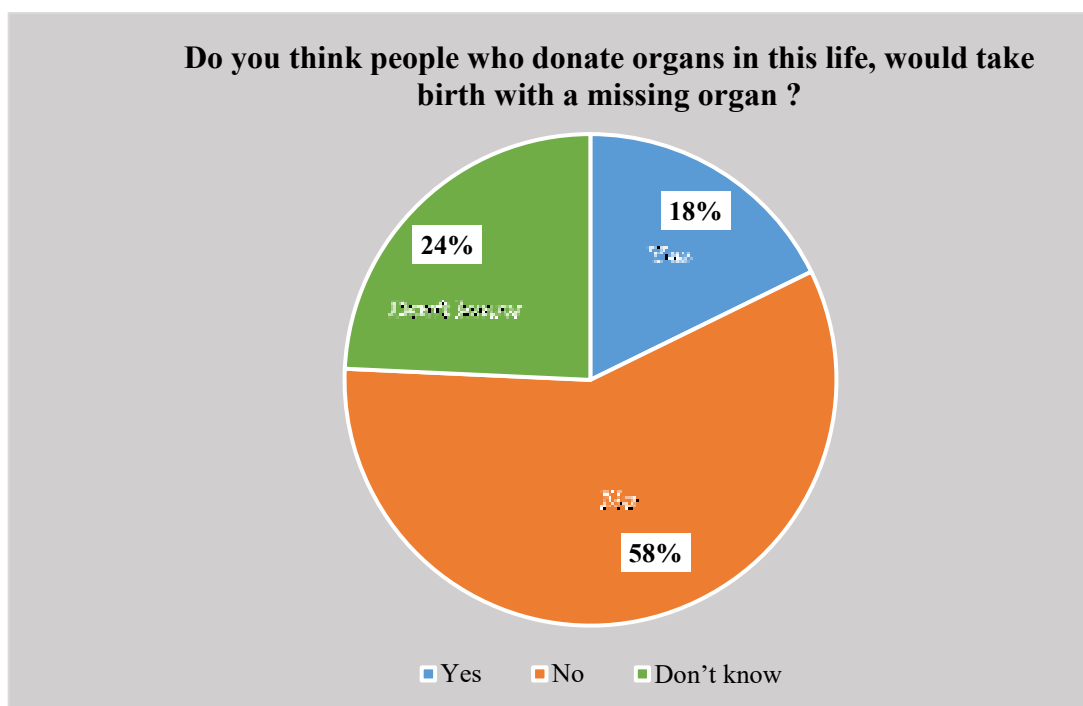


Among the 490 participants, 286(58%) of them were willing to donate deceased relative’s organs and remaining 204 (42%) of them were not willing for the organ donation of their deceased relatives as shown in Table25 and Graph 25.

Table 26: Distribution of study participants regarding mythical belief (n=490).

Mythical beliefs	Frequency	Percentage
Yes	87	18
No	284	58
Don't know	119	24
Total	490	100

Graph 26: Graphical representation of participants regarding mythical beliefs.

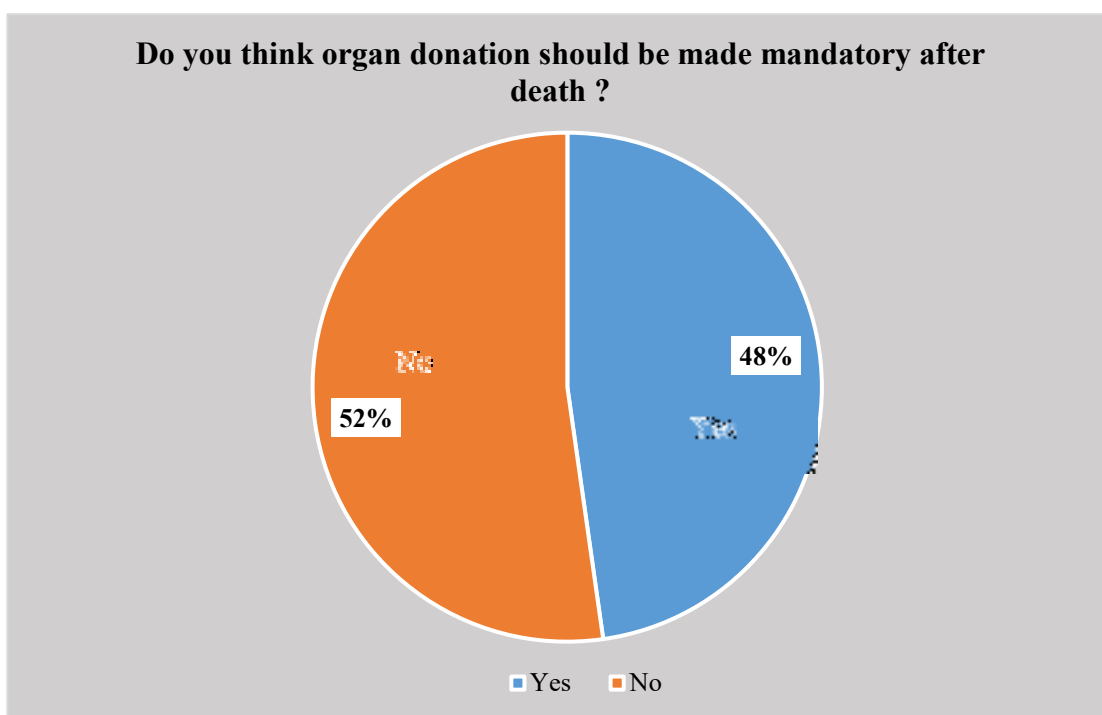


Among the 490 participants, 284(58%) of them were not having any mythical beliefs regarding organ donation which shows a positive sign among the study population as shown in Table 26 and Graph 26.

Table 27: Distribution of study participants regarding implementing mandatory organ donation after death (n=490).

Mandatory organ donation	Frequency	Percentage
Yes	234	48
No	256	52
Total	490	100

Graph 27: Graphical representation of participants regarding mandatory organ donation after death.

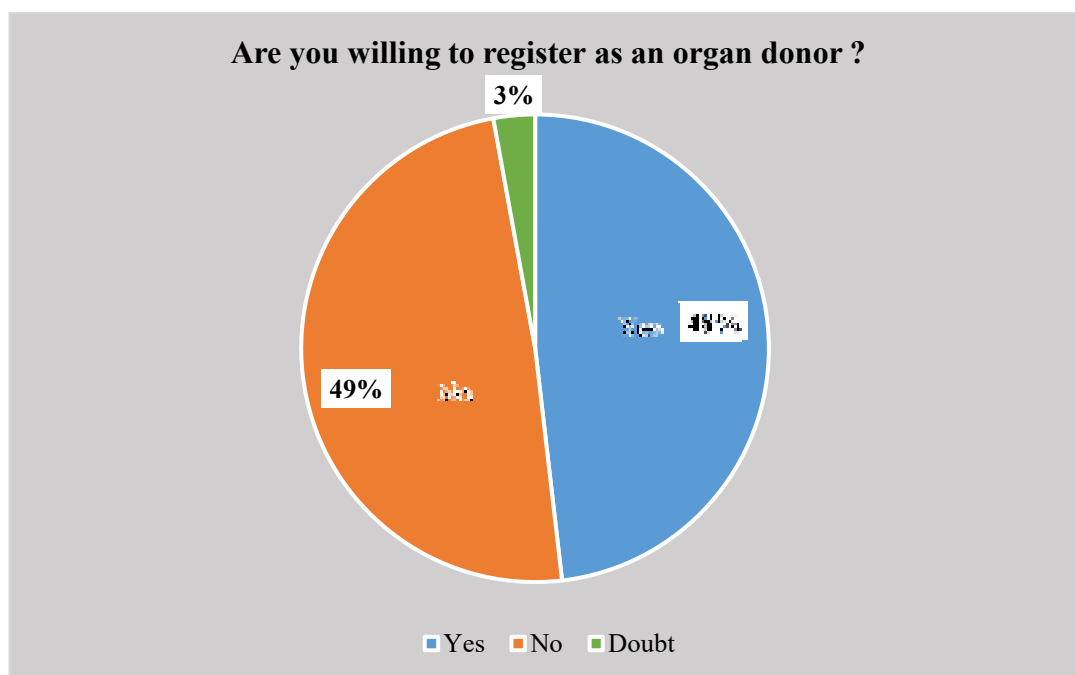


Among the 490 participants, 234(48%) of them expressed that, mandatory organ donation has to be implemented and remaining 256(52%) were not supporting mandatory organ donation as shown in Table 27 and Graph 27

Table 28: Distribution of study participants regarding willingness to register as an organ donor (n=490).

Willingness to register	Frequency	Percentage
Yes	236	48
No	240	49
Doubt	14	3
Total	490	100

Graph 28: Graphical representation of participants regarding willingness to register as an organ donor.



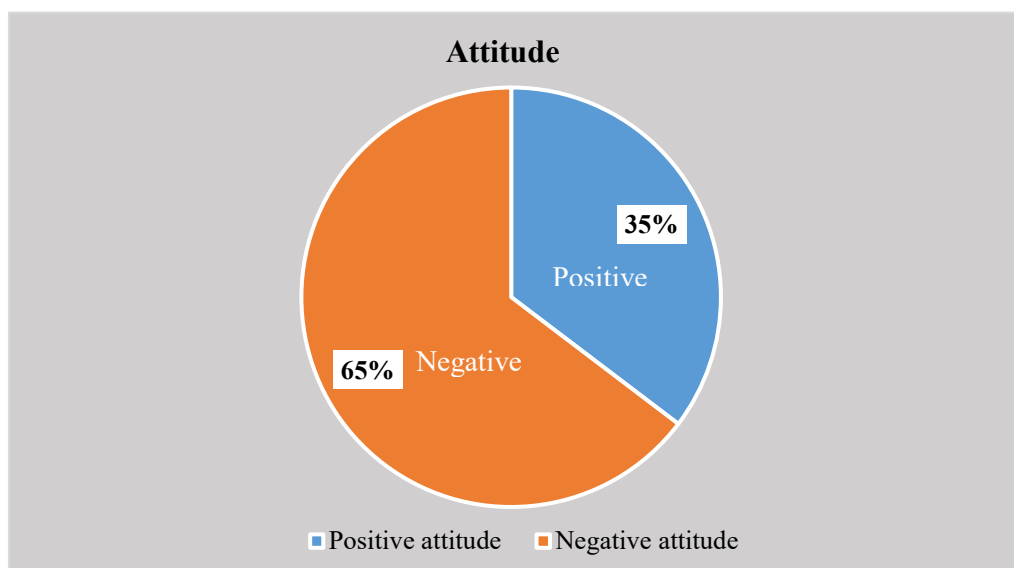
Among the study participants, 236 (48%) of them were willing to register as an organ donor, while 240 (49%) of them were not willing to register as an organ donor as shown in Table 28 and Graph 28.

Table 29: Distribution of study participants regarding attitude towards organ donation (n=490).

In our study, 68% of the participants were willing to donate their own organs, 58% supported their deceased relative’s organs and 48% willing to register as organ donors. Those who expressed positive intent for all the above questions were considered to be having positive attitude regarding organ donation.

Attitude	Frequency	Percentage
Positive attitude	173	35
Negative attitude	317	65
Total	490	100

Graph 29: Graphical representation of participants regarding attitude towards organ donation.



Among the 490 participants, 173(35%) of them had positive attitude towards organ donation whereas, remaining 317(65%) of them had negative attitude towards organ donation as shown in Table 29 and Graph 29.

DISCUSSION

The present study was a cross-sectional study conducted for a period of one year from 1st January 2020 to 31st December 2020, among non-medical college students and staff in and around Belagavi city to assess the awareness and attitude regarding organ donation. A total of 490 participants fulfilled the sample size.

In this study, maximum participation was shown by the pupils under the category of 18- 20 years and 21-30 years which depicts the younger population as shown in Table 1 and Graph 1. Similar results were found in a cross-sectional study conducted in Maharashtra where out of 169 participants 95% of them were between the age group of 22-25 years.²⁹

In our study out of 490 participants, 171(35%) were male and 319(65%) were female as shown in Table 2 and Graph 2. The male to female ratio was 1:2. Similar results were found in a community-based studies conducted in urban Puducherry (57%),² Tertiary care center Puducherry (60%),¹ and rural population in Maharashtra (57%).³⁵ Some of the studies reflected higher male participation than of female like in studies done in tertiary care center Pune (64%),¹³ and general population in Bangalore (53%).¹⁶

In this study the education level of the participants were mostly undergraduate (88%) followed by postgraduate (11%) and PUC (1%) as indicated in Table 4 and Graph 4.

In the present study out of 490 participants, 417(85%) were Hindus, 45(9%) were Christians and 27(6%) Muslims were as shown in Table 5 and Graph 5. Similar

results were found in a community-based study conducted in urban Puducherry (83%)², and general population in Bangalore (60%)¹⁶.

In our study out of 490 participants, 358(73%) of them were aware that death occurs due to scarcity in organ availability shown in Table 15 and Graph 15. Similar results were found in a community-based study conducted among common public in AIIMS, New Delhi (96%),²⁷ and general population in Bangalore (52%).¹⁶

In the present study out of 490 participants, majority of them i.e, 309 (63%) were unaware that only self-consent is valid in case of live donation as shown in Table 10 and Graph 10, but 311(64%) of them opined that any one among i.e, self-prior or relatives' consent is sufficient in case of deceased/braindead organ donation as shown in Table 11 and Graph 11.

Among the 490 participants, only 18% of them expressed that human organ cannot be sold as shown in Table 12 and Graph 12.

In this present study, only 14(3%) of the participants knew correctly that which all organs can be donated. Majority of them were aware that kidneys (83%) and eyes (74%) can be donated as shown in Table 8 and Graph 8. Similar results were found in studies conducted in north east India, where 82% were aware that eyes and kidneys (80%) can be donated,³³ while the common public in AIIMS New Delhi, 84% knew that kidneys can be donated and 86% knew that eyes can be donated.²⁷

In this study, source of information regarding organ donation, 44% of them got through media followed by 184 (38%) of them got through the healthcare-based awareness programs as shown in Table 14 and Graph 14. A literature search showed similar results in a community-based study done in urban Puducherry where, for

majority of them (63%) the source of information was through media.¹ In a cross-sectional study done in rural Puducherry, information through media was higher (83%),²⁶ and western Maharashtra (65%),²⁹ but contrasting results were seen in a cross-sectional study done in Ahmedabad, for majority (47%) of them the source of information was through doctors / hospital.²³ This could be due to effective programs conducted, which enlighten the community more than the media based awareness.

There are several government and non-governmental organization (NGO) programs being conducted throughout India, yet only 212(44%) of participants were aware of some organ donation programs. Majority of them were unaware of the existence of government funded programs as depicted in Table 17 and Graph 17. Even though, NGOs were organizing various awareness programs throughout India year after year, 206(42%) of them were unaware of such NGOs programs as shown in Table 16 and Graph 16.

In our study out of 490 participants, 221(45%) of them were aware that there are few statutory laws related to organ donation. Similar results were found in two across sectional studies done in Chennai (54%)³⁸ and Ahmedabad (74%).²³ But in community-based studies conducted in urban Puducherry and Bangalore only 29%,¹ and 6 %¹⁶ respectively were aware. This difference could be because in our study urban population was more and were accessible to information and their education level was also high.

In this study, level of adequate knowledge and awareness among participants regarding organ donation was assessed from responses to four important questions i.e, whether organ donation saves lives? need of consent to remove organs? can organs be sold? and is there any law regarding organ donation in India?. Among 490

participants, almost half of the participants were correctly aware of only three questions i.e, do organ donation saves life? consent and law regarding organ donation but only 106 (22%) of them were aware that it is illegal to sell organs as indicated in Table 12 and Graph 12 hence overall only 11% of the participants had adequate knowledge as shown in Table 20 and Graph 20. Similarly in studies done in urban Puducherry, awareness and knowledge score was 22%,² but a contrasting result was spotted in a study done in rural Puducherry (88%),²⁶ study conducted in north east India (79%)³³ and general public in Bangalore (53%).¹⁶

In our study, 334(68%) of them were willing to donate their organs after death as indicated in Table 22 and Graph 22. Similar results were found in a community-based study conducted in urban Puducherry (59%),² general population in Bangalore (76%),¹⁶ study conducted in rural Puducherry (70%),²⁶ a study conducted in Meghalaya (57%)³³ and a study done among common public in AIIMS New Delhi (81%).²⁷ But some contrasting results were observed in a study conducted among doctors and medical students where, willingness for organ donation was very less (16%),¹³ similar contrast results were seen in a study conducted in rural population in Maharashtra (48%).³⁵

Among 334 participants who were willing to donate their organ, 286(86%) of them were self-motivated to be an organ donor, but it's a pity that only 48(14%) of them were motivated through the governmental programs. This shows the extensive requirement of effective campaigning and organizing programs to improve the attitude and knowledge among the community regarding organ donation. Among 490 participants, 156(32%) of them were not willing to donate their organs. Most common reasons for their non willingness was disapproval from the family members for about

72(45%) of them, also myths or misconceptions was a reason for 56(36%) of them and health related issues after organ donation as reason for 26(18%) of the participants as shown in Table 24 and Graph 24. Similar study conducted in rural Puducherry, where 57% of them were not willing to donate.²⁶

In the present study, majority of the participants 286(59%) of them agreed to provide their deceased relative's organ for donation as indicated in Table 25 and Graph 25. Similar study conducted in rural Puducherry where 78% of them were willing to donate their deceased relative's organ.²⁶

In our study, 68% of the participants were willing to donate their own organs, 58% supported the donation of deceased relative's organs and 48% willing to register as an organ donor. However, only 173 (35%) of them had expressed their positive intent for all the above three questions who were considered to be having a positive attitude. A similar study done in urban Puducherry, where 58% of them had positive attitude regarding organ donation,² another similar study done in rural Puducherry, where 68% of them were ready to sign a donor card.²⁶

CONCLUSION

In the present study out of 580 participants, 90 were excluded because they were already a part of the transplantation process in their past (as per exclusion criteria), this was done as they might have certain awareness, knowledge and even positive attitude regarding organ donation and transplantation process. 95% of them were in the age group of 18-30 years. 65% of the participants were females resulting in a male female ratio as 1:2 in this study. Majority of them were Engineering students (66%). Most of the participants (85%) were Hindus.

Awareness regarding importance of organ donation was high (58 %) in the study population. Despite of 53% of the participants knowing who could be a organ donor, only 3% of them knew which all organs can be retrieved for donation. About half of the study population were aware that mandatory consent is required for organ donation. Only 22% of them were aware that it is illegal to sell organs. Nearly half of the participants knew that there exist some laws related to organ donation. shockingly only 54 (11%) participants did answer all of the four important questions based on awareness correctly who were considered as having adequate knowledge and awareness. So, the inference from the whole study is that awareness regarding organ donation is at rock-bottom even in an urban area.

Among the study participants, 68 % of them were willing to donate their own organs, 58% of them supported for organ donation of deceased relative and 48% of them were willing to register as an organ donor. These findings help in determining the attitude of the study participant regarding organ donation. As a result, those who have answered all these three important questions with positive intent were

considered to have positive attitude. Accordingly, 173 (35%) had positive attitude regarding organ donation. Though participants were ready to donate organ, many among them were hesitant to register as an organ donor. This has resulted in a significant decrease in the number of study participants who have a positive attitude.

Knowledge regarding organ donation was found not to be adequate among general population. Though sources of information are varied and many, the penetration through the urban areas seems to be minimal. If that's the case in urban regions, rural India which is about two-third of the population might have no understanding about the organ donation process. Beyond these few participants have many reasons for denial to donate organs like disapproval from family, mythical beliefs, health risks, etc...

Despite the limitation of this being a cross sectional study which does not represent the community as a whole, it provides a glimpse of lack of adequate knowledge and positive attitude regarding organ donation among non-medical college personals. Positive attitude of the study participants was found to be higher than adequate knowledge of organ donation.

Promoting the brain death concept to the society will have a high impact on brain dead/deceased organ donation. Also, it is the responsibility of the government and health care sector to work together and carryout more studies on the understanding of organ donation among the population, as well as implement necessary initiatives and programs to reach and educate the citizens about it. Moreover, curriculum-based awareness across all courses on regular basis could be done to increase the awareness and maintain positive attitude in the community.

As a matter of fact, many developed countries have sustained in their organ needs for transplantation by implementing the opt out system of organ donation and spreading awareness in school and college level education among the students, similarly we can also adapt programs with holistic approach which are religiously and culturally acceptable.

SUMMARY

One-year cross sectional survey-based study titled “A cross sectional study on knowledge, awareness and perception towards organ donation among adult population in an urban area” was conducted among non-medical college students and staff members in and around Belagavi city.

Permission was obtained from the principals of the respective colleges. A written informed consent was also obtained from the study participants, after explaining the nature of the study. A pretested and pre-designed questionnaire was made and used to assess the awareness and attitude of the participants regarding organ donation. Questionnaire covers the socio-demographic details such as age, sex, course, educational qualification, religion, and questions which help to assess the awareness and attitude regarding organ donation of the study population as mentioned in Annexures III.

In this present study, out of 580 participants, 90 were excluded because they were already a part of the transplantation process in their past (as per exclusion criteria), this was done as they might have certain awareness, knowledge and even positive attitude regarding organ donation and transplantation process. 95% of them were in the age group of 18-30 years. 65% of the participants were female and the male to female ratio was 1:2 in our study. Majority of them were Engineering students (66%). Most of the participants (85%) were Hindus.

Awareness regarding importance of organ donation was high (58 %) in the study population. Despite of 53% of the participants knowing who could be a organ donor, only 3% of them knew which all organs can be retrieved for donation. About half of the study population were aware that mandatory consent is required for organ

donation. Only 22% of them were aware that it is illegal to sell organs. Nearly half of the participants knew that there exist some laws related to organ donation. shockingly only 54 (11%) participants did answer all of the four important questions based on awareness correctly who were considered as having adequate knowledge and awareness. So, the inference from the whole study is that awareness regarding organ donation is at rock-bottom even in an urban area.

Among the study participants, 68 % of them were willing to donate their own organs, 58% of them supported for organ donation of deceased relative and 48% of them were willing to register as an organ donor. These findings help in determining the attitude of the study participant regarding organ donation. As a result, those who have answered all these three important questions with positive intent were considered to have positive attitude. Accordingly, 173 (35%) had positive attitude regarding organ donation. Though participants were ready to donate organ, many among them were hesitant to register as an organ donor. This has resulted in a significant decrease in the number of study participants who have a positive attitude.

Adequate awareness regarding organ donation in the study population was 11% and positive attitude towards organ donation in study population was 35%.

This study reiterates that promoting the brain death concept to the society will have a high impact on brain dead/deceased organ donation. Also, it is the responsibility of the government and health care sector to work together and carryout more studies on the understanding of organ donation among the population, as well as implement necessary initiatives and programs to reach and educate the citizens about it. Moreover, curriculum-based awareness across all courses on regular basis could be done to increase the awareness and maintain positive attitude in the community.

RECOMMENDATIONS

1. A further study with large sample size representing general population can be done.
2. Focused group discussions and face to face interview with the respondent.
3. Awareness programs with pre and post tests to assess the gap and knowledge in awareness also follow up of same sample to know the decay.
4. Development of curriculum-based awareness among all educational courses.
5. Govt has to establish an organized national wide database to make the recipient to aware of the donors to recipients.

STRENGTHS

1. This study covers the non-medical colleges where knowledge on human health is less, hence non-biased results can be expected.
2. This is the first of a kind survey study on awareness towards organ donation in Belagavi city.

LIMITATIONS

1. Close ended questionnaire format might restrict the thought process of the respondent.
2. In Survey based studies, true attitude of the study participant might not be reflected.

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