

Research Article

# Donor profile and trends of eye donation in Central India

Neha Singh Jat\*

Department of Ophthalmology, Gandhi Medical College, Bhopal, Madhya Pradesh, India

## Abstract

**Background:** The present study was conducted to study the donor profile and to assess the trends of cornea donation.

**Methodology:** This was conducted as a hospital based cross sectional study at a tertiary care centre in Central India for a period of 5 years. Data was retrieved from 70 patients from eye bank who filled form of eye donation at Eye bank of our institution. Sociodemographic profile of donors, cause of death and time since death was recorded. Source of information regarding corneal donation and reason for not willing to donate the cornea for research purpose was recorded from the filled form. Further cornea enucleated were subjected to serology and their utilization for various purposes were recorded in questionnaire.

**Results:** The present study retrieved data from a total of 70 donor forms with mean age of  $65.84 \pm 18.4$  years. Cornea obtained from younger patients were mainly utilized for corneal transplantation whereas that from elderly age group  $> 60$  years were mainly utilized for research/training purpose and the observed difference was statistically significant ( $p < 0.01$ ). The corneas retrieved and utilized immediately after death were significantly used for optical or therapeutic purposes ( $p < 0.05$ ).

**Conclusion:** The present highlights the donor profile and trends of corneal donation at the tertiary care facility of Central India. It was observed that though the younger population and older population both are aware regarding corneal donation but still they are less aware on purpose for which cornea can be utilized. Quality of donor cornea is better when death to enucleation time interval was less.

## Introduction

Blindness is increasingly been recognized as a global health problem [1]. WHO states that approximately 80% of the blindness is preventable. The most common cause of preventable blindness include disease affecting cornea [2]. In India, corneal blindness affect approximately 6.8 million persons with vision less than 6/60 in at least one eye, however in about 1 million persons, both the eyes are involved [3,4]. According to data from National Programme for Control of Blindness (NPCB), about 1,20,000 persons are affected due to corneal blindness and approximately 25,000-30,000 cases of corneal blindness add to this pool every year [3].

The effective treatment with high success rate in restoring sight among patients with corneal blindness include corneal transplantation. National Programme for control of blindness (NPCB), initiated by Government of India through its continuous efforts tried to reduce the backlog of preventable corneal blindness through comprehensive eye care services,

including corneal transplantation [5]. However, even after increasing awareness of corneal donation, the number of donors remains much lower and also waiting period for corneal transplantation remains high at most hospitals across the country [6]. Apart from the efforts of increasing awareness, the Eye Bank Association of India also made efforts to increase the corneal procurement rate over several years. The current procurement rate of cornea in India is approximately 49,000 per year, this rate is much lower than needed [7,8].

The procurement rate of corneal donation could possibly be enhanced by increasing awareness among population and also by identifying potential barriers and overcoming those barriers to eye donation. The present study was thus conducted at a tertiary care centre to study the donor profile and to assess the trends of cornea donation.

## Methodology

The present study was conducted as a hospital based cross sectional study at a tertiary care centre in Central India

## More Information

**\*Address for Correspondence:**

Neha Singh Jat, Junior Resident, Department of Ophthalmology, Gandhi Medical College, Bhopal, Madhya Pradesh, India,  
Email: nehasinghjat@gmail.com

**Submitted:** April 02, 2021

**Approved:** April 29, 2021

**Published:** April 30, 2021

**How to cite this article:** Jat NS. Donor profile and trends of eye donation in Central India. Int J Clin Exp Ophthalmol. 2021; 5: 005-008.

**DOI:** 10.29328/journal.ijceo.1001035

**Copyright:** © 2021 Jat NS. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Keywords:** Donor; Utilization; Procurement; Corneal transplant





for a period of 5 years i.e. from 1<sup>st</sup> December 2014 to 1<sup>st</sup> December 2019. Data was retrieved from 70 patients from eye bank who filled form of eye donation at Eye bank of Gandhi Medical College and associated Hamidia Hospital Bhopal. The family members of these deceased were enquired about the willingness to donate the cornea and reasons for not willing to donate to identify potential barriers. Sociodemographic profile of donors was recorded using questionnaire (which was self-designed). Cause of death and time since death was recorded. Source of information regarding corneal donation and reason for not willing to donate the cornea for research purpose was recorded from the filled form.

Further cornea enucleated were subjected to serology and their utilization for various purposes were recorded in questionnaire.

The performas were self-made and based on official eye donation form and were filled after proper written and informed consent.

Data analysis- Data was compiled using Ms Excel and analysed using SPSS 20 software. Data was grouped and expressed as frequency and percentage. Chi square test was applied and *p* value < 0.05 was considered statistically significant.

## Results

The present study retrieved data from a total of 70 donor forms with mean age of 65.4 ± 19.11 years.

In present study, majority of donors belonged to age group of 61 to 80 years (42.2%) followed by 41 to 60 years of age (22.9%). About 71.4% of the donors were males. Most common cause of death was cardiopulmonary arrest in 45.7% cases. However, the cause remain unknown in 7.1% cases (Table 1).

About 31.4% corneas were donated in 2017 followed by 25.7% and 22.9% corneas were donated in 2016 and 2018 respectively (Table 2).

Decision of donation was based on prior pledging in 44.3% cases whereas next of kin made the decision in 55.7% cases. Source of motivation was counselor in maximum cases followed by TV/ Radio in 25.7% cases (Table 3).

Also the present study observed statistically insignificant association of age and gender with grading of cornea (Table 4).

In present study, cornea obtained from younger patients were mainly utilized for corneal transplantation whereas that from elderly age group > 60 years were mainly utilized for research/ training purpose and the observed difference was statistically significant (*p* < 0.01). Also the present study observed statistically significant association between death enucleation time and corneal utilization (*p* < 0.05). However no association of utilization with gender was observed (*p* > 0.05) (Table 5).

**Table 1:** Distribution according to Baseline variables.

Baseline variables		Frequency (n = 70)	Percentage
Age group (years)	≤ 20	3	4.3
	21-40	5	7.1
	41-60	16	22.9
	61-80	30	42.9
	> 80	16	22.9
Gender	Male	50	71.4
	Female	20	28.6
Cause of death	Cardiopulmonary arrest	32	45.7
	Brain death	1	1.4
	Acute MI	6	8.6
	CVA	5	7.1
	CRA	3	4.3
	Shock	3	4.3
	Head injury	2	2.8
	CAD	2	2.9
	Sepsis with resp failure	2	2.9
	Cardiogenic shock	1	1.4
	Septicemia	1	1.4
	Septic shock	1	1.4
	RTA	4	5.7
	Kidney failure	1	1.4
	Hanging	1	1.4
Unknown	5	7.1	

**Table 2:** Distribution according to trends of corneal donation.

Year	Frequency (n = 70)	Percentage
2014	1	1.4
2015	1	1.4
2016	18	25.7
2017	22	31.4
2018	16	22.9
2019	12	17.1

**Table 3:** Distribution according to corneal donation and related information.

		Frequency (n = 70)	Percentage
Next in kin/ Prior pledging	Next in kin	39	55.7
	Prior pledging	31	44.3
Source of motivation	Counselor	28	40
	Family member	9	12.9
	Both	1	1.4
	Neighbor	3	4.3
	Newspaper	8	11.4
	TV/ Radio	18	25.7
	No answer	3	4.3

**Table 4:** Association of age and gender with grading.

Variables		Grading			p value	
		Excellent to very good	Good to fair	Poor		
Age group (years)	RE	≤ 60	1 (100)	20 (39.2)	3 (16.7)	0.08
		> 60	0 (0)	31 (60.8)	25 (83.3)	
	LE	≤ 60	1 (100)	20 (40)	3 (15.8)	0.06
		> 60	0 (0)	30 (60)	16 (84.2)	
Gender	RE	Male	1 (100)	37 (72.5)	12 (66.7)	0.73
		Female	0 (0)	14 (27.5)	6 (33.3)	
	LE	Male	1 (100)	37 (74)	12 (63.2)	0.55
		Female	0 (0)	13 (26)	7 (36.8)	

**Table 5:** Association of corneal utilization with baseline variables and time since death.

Variables		Corneal utilization				p value
		Optical	Therapeutic	Tectonic	Research	
Age group (years)	≤ 60	34 (51.5)	2 (10.5)	0 (0)	12 (19.4)	0.01
	> 60	22 (39.5)	17 (89.5)	3 (100)	50 (80.6)	
Gender	Male	44 (78.6)	10 (52.6)	3 (100)	43 (69.4)	0.11
	Female	12 (21.4)	9 (47.4)	0 (0)	19 (30.6)	
Death enucleation time (hours)	≤ 4	42 (75)	9 (47.4)	2 (66.7)	41 (66.1)	0.14
	> 4	14 (25)	10 (52.6)	1 (33.3)	21 (33.9)	

## Discussion

Corneal transplantation is considered as one of the most successful organ transplant which is utilized for the management of corneal blindness. The present hospital based study revealed sociodemographic profile and cause of death among donors and non donors. Initially organ donation was the topic of old age, now even younger age group is involved in corneal donation. About 34.4% donors belonged to less than 60 years of age. Majority i.e. 42.9% of donors belonged to 61 to 80 years. About 71.4% of the donors were males. The donor-age distribution from literature reveals that the majority of the donors are over 60 years of age with a large population between 70 and 80 years age-group similar to present study [9,10]. Sugar, et al. observed maximum donors as males as compared to females [11].

The most common cause of death was cardiorespiratory failure. Similar findings were documented by Ranjan, et al. [12] and Patel, et al. [10] in which the most common cause-of-death among donors was cardiorespiratory failure (34% and 50.5% respectively).

Knowing cause of death is important as it helps in deciding the purpose of enucleation whether for transplantation or research purposes.

Even good grade corneas were not utilized for transplantation when cause of death was malignancy or sepsis. Most of the donors in the present study were of elderly age group therefore most common cause of death among donor was cardiovascular disease.

In our study, donations were pledged priorly in 44.3% cases whereas next of kin made the decision in 55.7% cases. Source of motivation for corneal donation was counselor in 40% cases and TV/ Radio in 25.7% cases. Other sources included newspaper, family members, neighbors etc. Source of motivation for corneal donation was counselling in a study by Acharya, et al. in which about 41% participants were willing to donate cornea after counselling [13]. Sharma, et al. in their study observed 61 (57.5%) cases where the willingness come post direct motivation by grief counselors [6]. Yew, et al. concluded that imparting proper knowledge about eye donation can increase the corneal retrieval [14].

Kokab, et al. in their study observed major source of information for eye donation to be the mass media/TV/radio/movies (43.5%) followed by posters/pamphlets in 24% cases [15].

About 44.3% corneas were utilized for training purpose in present study whereas 40% and 13.6% corneas were utilized for Optical and therapeutic purposes respectively. Cornea from younger donors were mainly utilized for corneal transplantation whereas that from elderly age group > 60 years were mainly utilized for research/ training purpose and the observed difference was statistically significant ( $p < 0.01$ ). Corneas with lesser death utilization time were used mainly for optical and therapeutic purposes ( $p < 0.05$ ). However no association of utilization with gender was observed ( $p > 0.05$ ). Contrasting results were obtained by Raj, et al. in which 79.77% belonged to the age group of > 65 years which clears the doubt that higher age limit cannot be criteria for exclusion of utility of the tissue [16]. Armitage, et al. reported only 45% of utilization rate in donors belonging to greater than 80 years [17].

Our study is associated with certain limitations. As the study was conducted as a facility based study with the aim assess trends and donor profile, it could only cater only small group of population which could not specify geographic area. A large community based study with defined geographic boundaries will help in revealing actual awareness and willingness of population regarding corneal donation and also help in assessing the potential barriers which if overcome can help in improving the corneal procurement rate.

## Conclusion

The present highlights the donor profile and trends of corneal donation at the tertiary care facility of Central India. It was observed that:-

- ◆ Males donors were more eyes than females because they have higher literacy rate.
- ◆ Personal approach by medical personnel/counselor play main role in clearing all doubts and taboos regarding eye donation and to motivate public for eye donation. For this, awareness programs led by ophthalmologists, health workers/paramedics, non-governmental organizations should be planned and executed at community level targeting all age groups for a better tomorrow.
- ◆ Also, the social media has been trying to influence/spread awareness about eye donation, but conversation rate of pledging into donation is less. High willingness to donate eyes and increase the actual eye donation among the communities can be achieved by more campaigning, educational programs through television, newspapers, radio and posters.

Quality of donor cornea is better when death to enucleation time interval was less.



## References

1. World Health Organisation. Visual Impairment and Blindness. WHO Fact Sheet. Geneva, Switzerland: World Health Organisation; 2014. <http://www.who.int/mediacentre/factsheets/fs282/en/>
2. Gupta PC, Duggal M, Jamir L, Sharma D, Kankaria A, et al. Knowledge and Attitude Toward Corneal Donation Among High School Children in Northern India. *Cornea*. 2017; 36: 611-616.  
**PubMed:** <https://pubmed.ncbi.nlm.nih.gov/28306599/>
3. National Programme for Control of Blindness. 2020. <http://pbhealth.gov.in/pdf/Blindness.pdf>.
4. Dandona R, Dandona L. Corneal blindness in a southern Indian population: need for health promotion strategies. *Bri J Ophthalmol*. 2003; 87: 133–141.  
**PubMed:** <https://pubmed.ncbi.nlm.nih.gov/12543736/>
5. National Blindness Control Program. Statewise Targets and Achievements for Various Eye Diseases during 2015-2016. New Delhi, India: National Blindness Control Progra. 2016.
6. Sharma B, Shrivastava U, Kumar K, Baghel R, Khan F, et al. Eye Donation Awareness and Conversion Rate in Hospital Cornea Retrieval Programme in a Tertiary Hospital of Central India. *J Clin Diagnostic Res*. 2017; 11: NC12–NC15.  
**PubMed:** <https://pubmed.ncbi.nlm.nih.gov/28969171/>
7. Saini JS. Realistic targets and strategies in eye banking. *Indian J Ophthalmol*. 1997; 45: 141-142.
8. Ramayamma International Eye Bank: Celebrating 25 years. Hyderabad, India: Department of Communications L V Prasad Eye Institute. 2014.
9. Ranjan A, Das S, Sahu SK. Donor and tissue profile of a community eye bank in Eastern India. *Indian J Ophthalmol*. 2014; 62: 935–937.  
**PubMed:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4244740/>
10. Patel HY, Brookes NH, Moffatt L, Sherwin T, Ormonde S, et al. The New Zealand National Eye Bank study 1991-2003: a review of the source and management of corneal tissue. *Cornea*. 2005; 24: 576-582.
11. Sugar J, Montoya M, Dontchev M, Tanner JP, Beck R, et al. Donor risk factors for graft failure in the cornea donor study. *Cornea*. 2009; 28: 981–985.  
**PubMed:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3124710/>
12. Ranjan A, Das S, Sahu SK. Donor and tissue profile of a community eye bank in Eastern India. *Indian J Ophthalmol*. 2014; 62: 935–937.  
**PubMed:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4244740/>
13. Acharya M, Farooqui JH, Dave A, Chaku D, Ganguly KK. Eye donation in north India: Trends, awareness, influences and barriers. *Indian J Ophthalmol*. 2019; 67: 1570–1574.  
**PubMed:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6786220/>
14. Yew YW, Saw SM, Pan JC, Shen HM, Lwin M, Yew MS. Knowledge and beliefs on corneal donation in Singapore adults. *Br J Ophthalmol*. 2005; 89: 835–840.  
**PubMed:** <https://pubmed.ncbi.nlm.nih.gov/15965162/>
15. Kokab S, Kokab S. Eye donation Awareness among paramedical staff of different hospitals in Raichur district: a survey. *J Evolv Med and Dent Sci*. 2013; 2: 3249-3256.
16. Raj A, Mittal G, Bahadur H. Donor factors influencing corneal tissue utilization in North India. *Sudanese J Ophthalmol*. 2018; 10: 44.
17. Armitage WJ, Easty DL. Factors influencing the suitability of organ-cultured corneas for transplantation. *Investigat Ophthalmol Visual Sci*. 1997; 38: 16-24.