A Study on Eye Donation Awareness Among Medical and Engineering Students in Puducherry

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Background:- It is observed that 12% of the world’s blind population is affected by corneal blindness, a visual impairment that is amenable to treatment. The alarming figures rise every year, keeping India in the lead. Corneal transplantation remains the mainstay of treatment for restoring vision in such patients. Literature review in India reveals that the awareness about eye donation in public, especially among the youth is very low. Hence creation of awareness carries paramount importance. The aim of this study is to compare awareness between the Medical and Engineering college students in Puducherry and to explore ways to involve medical community and other sectors.

Materials and Methods:- Students following their respective courses (I – IV year) during January to June 2016 participated in the study. Out of 679 students, 277 were medical and 402 were engineering students. The study started with initial clarification of questions followed by administration of pretested and semi-structured questionnaire with informed consent. The results were derived through statistical analysis.

Results:- All the students were aware of eye donation. Awareness on various parameters is higher among the medical students. Television channels were considered as the most powerful tool amongst the media to reach out to the public.

Conclusion:- The study is in agreement with similar studies towards the necessity for awareness creation. Creation of awareness on eye donation can greatly improve current statistics. The medical students, in close collaboration with the community groups like Non Governmental Organisations, can reach out to public. The eye banks and medical colleges can be linked up for advocacy programmes. Education on organ donation is a must for the society. The student community, medical and paramedical staff should be actively involved in this regard. Media campaign can play a commendable role to reach out to the masses for optimum benefit.

Keywords: eye donation, corneal transplantation, awareness, youth, students

Introduction
The visual impairment study (2010) estimated that 285 million people are visually impaired, out of which 39 million people are blind. Corneal blindness accounts for 12% of the world’s blind and India accounts for the majority, thus making it a global priority. The number of patients awaiting corneal transplantation is considerably growing in India. Therefore, there is a need for awareness of eye donation in an effort to increase the procurement of donor corneas. With this background, a study was undertaken in two colleges of Puducherry with an aim to study and compare awareness between medical and engineering college students and to explore ways to involve medical community and other sectors.

Materials And Methods
A cross sectional study was conducted in Puducherry among 679 college students, out of which, 277 were medical students (I – IV year) and 402 were engineering students (I to IV year). The study was conducted during January-June 2016 with ethical permission from the institutional ethics committee. The study started with an initial clarification of questions and ambiguity among the students followed by administration of pre-tested and semi-structured questionnaire with their consent. The questionnaire consisted of 15 questions related to eye donation ranging from the source of information about eye donation, awareness of corneal transplantation, information about eye donors, information regarding eye donation, criteria for eye donors, awareness of eye banks, etc. The selection criteria included students in their under graduate level pursuing their course of study. Medical and paramedical staff and students who completed their courses were excluded. The data was collected and analyzed.

Results
All the 679 students participated actively and provided answers for all the questions in the study. The data was analyzed. All the students, both medical and engineering, were aware of eye donation.

1. Did you know that one eye donor can provide vision to two blind persons? Yes/No. 74.08% of the students knew that one eye donor can provide vision to two blind persons, while 25.92% did not.

2. Did you know that the whole eyeball is removed? Yes/No. 56.80% were aware of this fact while 43.20% were oblivious to it. Out of 277 medical students, 54.90%
knew that the whole eyeball is removed, while out of 402 engineering students, 58.20% were aware, which is more than the number of medical students.

3. Did you know that only cornea is used for transplantation? Yes/No.
Knowledge about corneal transplantation was well known to 75.70% of all the students, wherein 83.03% were medical students and 70.64% were engineering students.

4. What is your source about eye donation? Television/radio/internet/advertisements in hospitals/newspapers or magazines/friends?
The response is depicted in Figure 1a & Figure 1b.

5. Did you know that the ideal time interval between death and enucleation is within 6 hrs? Yes/No.
The majority of the study population, 71.87% was not familiar with the enucleation time limit, whereas only 28.13% was aware. Out of this, 29.5% of the medical students and 27.86% of the engineering students were acquainted with the information.

6. Is there any age limit for donation? Yes/No/Don’t know.
63.77% knew about the age limit for eye donation. 34.02% denied the fact that an age limit exists while 2.21% didn’t know. The comparison between medical and engineering students is shown in Figure 2.

7. Are there any contraindications for eye donation? Yes/No/Don’t know.
The response is shown in Figure 3a & Figure 3b.

8. Do you know where the donated eyes are stored? Yes/No.
Information about storage of the donated eyes was known to 52.20% of the study group and not known to 47.80%. Out of this, 57.03% comprised of medical students while 48.80% comprised of engineering students.

9. Are you aware of eye bank? Yes/No.
Awareness about eye bank was noted in 69.40% of the students whereas 30.60% were not aware about it. 74% of medical students and 66.19% of engineering students knew about the eye bank.

10. Can a person with diabetes/hypertension/any chronic disease donate eyes? Yes/No/Don’t know.
The response is shown in Figure 4a & Figure 4b.

11. Do you know that the consent of relatives is required for donation after death? Yes/No.
58.20% of the study group was acquainted with the requirement of relative’s consent whereas 41.80% was not. This requirement was known to 68.30% of medical and 51.24% engineering students.

12. Are you willing to donate your eyes? Yes/No.
A striking 84.80% of the student population expressed willingness to donate their eyes while 15.20% did not. This willingness was expressed by 87.40% medical students and 83.10% engineering students.
13. Have you registered for eye donation? yes/no.
   A mere 3.80% of the study population had pledged to donate their eyes while the majority, 96.20% had not. Out of those registered for eye donation, 2.50% consisted of medical students while 4.70% made up the engineering population.

**Discussion**

The major causes of corneal blindness include trachoma, corneal ulcer following xerophthalmia and ophthalmia neonatorum.\(^2\) The other causes of corneal blindness worldwide include the use of toxic medications, Onchocerciasis and ocular trauma.\(^2\) While this is the global scenario, the National Program for Control of Blindness (NPCB) has estimated that a total of 120,000 people are affected by corneal blindness and every year, an additional 25,000-30,000 cases of corneal blindness get added to this alarming number.\(^4\) Corneal transplantation to restore vision in the corneal blinds patients remains the most common type of human transplant surgery.\(^7\) Although existing strategies to prevent corneal blindness may be more cost-effective, visual rehabilitation by corneal transplantation remains the major treatment for restoring vision in patients with corneal blindness.\(^9\) Hence, eye donation awareness amongst the general population becomes a matter of paramount importance, especially in a country like India. Vision restoration through corneal grafting is possible for a sizeable population of the corneal blind in India. It has led to a sustained multipronged drive to raise awareness of eye donation and thus corneal transplantation.\(^9\) India has a strong infrastructural readiness to rapidly scale its keratoplasty numbers.\(^2\) However, a major obstacle for eye donation is the lack of awareness and a negative attitude in the general population.\(^10\) In this study, all the students i.e., 100% were aware of the concept of eye donation. In a study among medical students in Delhi, 99.4% were aware that the eyes could be donated after death.\(^11\) In another study among nursing students in Bangalore, 96.8% were aware of eye donation,\(^2\) and 80.6% were aware in a study among adults in rural Pondicherry.\(^10\) It is evident that the mass media plays an important role in creating awareness. Newspapers-spreading the word through peers and social media, also have a responsibility of spreading awareness. The results indicate that 38.10% of the information was from television and radio channels. Peer groups also played an important role in spreading the information (Figure 1a). Our study indicates that mass media, particularly television (38.1%), seems to be the most important source for awareness about eye donation among the study population, similar to the findings by Dandona et al., Krishnaiah et al., Bhandary et al., and Ronanki et al.\(^11-14\) However, in a study by Priyadarshini B et al., among adult population of South India, the major source of knowledge was publicity campaigns.\(^9\) The present study also indicates that television has been the main source of information for 42.2% engineering students and 32.1% medical students, while another 32.8% of the latter ascribe their source to hospital advertisements (Figure 1b).

Our study shows that 74.08% of the student population was aware of the aspect of one donor providing vision for two blinds, which includes 75.1% medical and 73.4% engineering students. These figures are closer to the findings of Suresh et al where in 87.53% knew that one donor can provide vision for two blind persons.\(^15\) However, that study covered 372 rural and hospital based population whereas our study includes 679 medical and engineering students. The whole eyeball is generally removed from the donor for the purpose of corneal transplantation. However, only corneal removal is also practical, successful and is being practiced in some parts of India, although the advantage with removal of the whole eye is that other parts like sclera can also be used for medical and research purposes.\(^10\) Out
of the whole population screened, 56.80% were aware that the whole eyeball was removed and 43.20% felt it was partly removed. It is interesting to note that engineering college students had more awareness than the medical students regarding this point, 76.00% were well aware that only the cornea is utilized for transplantation. In a study among students of University of Malaya, 65.25% students knew that either the whole eye (40%) or cornea (25.25%) is removed from the donor but only 30.25% knew that it is the cornea that is transplanted. A study conducted at Hubli showed that 62.2% of medical students believed the whole eyeball is transplanted. In a study by Gupta A et al on nursing students, a fairly large number of students (74.4%) knew that only the cornea from the donated eye is used for grafting while in a study by Suresh K et al, 31.5% said that the whole eyeball is removed from the donor. Our study reveals that 54.8% medical students and 58.2% engineering students were aware that the whole eyeball is removed after death, the prevalence of which is lower than the other studies. However, it is interesting to note that 83.03% medical and 70.6% engineering students knew that the cornea is the part used for grafting. This shows that more number of medical students were aware of this fact compared to other studies conducted by Suresh et al, Dhaliwal et al and Gupta et al. It was also noted that only 28.13% of students in this study were aware that the ideal time interval between death and enucleation is within 6 hours, similar to a study by Megachandra et al, where in less than 50% of the medical students were aware of this fact. However, other studies indicate that 63.6% students (medical and non-medical) had a fairly good knowledge in this regard.

There is no fixed age limit for an eye donor. However, the current study indicates that 63.77% of student population felt that there is an age limit for eye donation. A study conducted in Bengaluru revealed that 170 out of 200 life science students believed that there is no age limit for donating eyes. The current study depicts that 37.55% medical and 31.6% engineering college students felt there is no age limit, projecting that medical students have more knowledge than the engineering college students in this regard (Figure 2).

The donated eyes are stored in an eye bank, which acts as a centre for the collection, storage, processing and distribution of donor corneas. The whole eye ball can be stored in the refrigerator (moist chamber) for up to 48 hours, while the corneoscleral button preserved in Optisol medium could be stored for up to 14 days before transplantation. According to our study, 69.4% are aware of the existence of the eye bank which includes 74% of medical college students and 66.19% of engineering college students. The study by Reddy et al showed that more than half of the students (57.75%) did not know that the donor eye can be stored before transplantation. In the study by Lakshmikant et al, majority of the students ie. 74.1% were not aware of the eye bank facility in their vicinity but they knew that the hospital which possessed an eye bank was the best place for collecting the eyes. A study by Kumari R showed that 40% of the students knew where the donated eyes are stored. There are contraindications for corneal transplantation. All deceased people can be considered as suitable donors except when the cause of death or other factors might pose risk factors for the individuals performing the enucleation.

It is noted from the study that 46.40% were aware of contraindications whereas 47.56% thought there are none. (Figure 3a). This included 63.90% medical students and 34.33% engineering students which showed that medical students were more knowledgeable about the existence of contraindications. (Figure 3b). Among these students, 64% felt that people with either diabetes, systemic hypertension or any chronic disease can donate. This included 69.3% medical students and 60.40% engineering students. In this case, HIV/AIDS was not specified as a contraindication. Another study among patients showed that their perceptions regarding contraindications for eye donation include HIV (70.59%), cataract (14.59%), and diabetes (9.88%). In a study in Melbourne, it was noted that five criteria were identified that excluded up to 85% of the population as ineligible, which were haematological malignancies, neurodegenerative conditions, non-haematological malignancies, chronic renal failure and eye disease. Dhaliwal, in his study noted that most medical students listed corneal disease as a contraindication for eye donation. However, other contraindications were also listed, such as ocular infections, ocular tumours, uveitis and glaucoma. HIV and Hepatitis-B infection were cited infrequently as systemic contraindications by both medical students and the control group. It is evident that both the groups had limited knowledge of other systemic contraindications. Consent is obtained from relatives of the donor after death. 41.8% of students in this study agreed that consent of relatives is required after death. This included 68.30% medical and 51.24% engineering college students. In the study by Kumar R, 77.5% students felt that consent of the family members is not required for donation. Among a paramedical group in Maharashtra, 75% felt that the next of kin has the right to give consent for donation. The awareness is more among the medical students than the engineering college students, similar to the study in Malaysia where the fact that the next of the kin has the right to give consent was known to 55.6%. It is interesting to note that 84.8% students are willing to pledge their eyes. However, only 4.5% have registered for eye donation. This includes 87.4% medical and 83.1% engineering students. This is a significantly high percentage (84.8%) who are willing to donate, resembling the study by Manjunath, where 78% were willing to pledge and the study by Gupta A et al, where 85.1% were either willing or had already pledged to donate their eyes. This is quite contrary to the other study among urban population of Andhra Pradesh where only 44.9% were willing to pledge their eyes and the study by Tandon R et al where 41.5% were willing, among relatives of deceased. The results indicated that only 3.8% of those who were willing were registered for donation of eyes. This included 4.7% of engineering college students.
and 2.5% of medical college students. This is similar to a study by Dhaliwal et al where age and gender adjusted prevalence of awareness of eye donation was 73.8% but only 1.9% had pledged the eyes. This study is also similar to the findings of Dhaliwal U among final year medical students where more than 80% of the participants of both groups were willing to donate, which was an encouraging finding.

**Conclusion**

Studies point out that both medical and non-medical students have good awareness regarding the act of eye donation. The present study, in line with the other findings, points out that it is possible for medical students to create awareness about eye donation, provide proper guidance, explain the benefits of eye donation through awareness camps, follow up with families who received the donation and explain how the person had benefitted sharing the experiences with a wider audience. Medical students can also work in close collaboration with the community groups and NGOs who are working in this field, nationally and internationally, and spread the word to reach out to the masses. Another step is that eye banks and the medical colleges should be linked up for advocacy programmes. Paramedical staff should be involved in the educational and promotional programmes.

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