

Awareness, knowledge and willingness about eye donation among first year medical and nursing students of a medical and nursing college of north Kolkata, India

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Received: 14th March 2020; **Accepted:** 22nd June 2020; **Published:** 01st July 2020

Abstract: *Purpose:* To study the awareness, knowledge and willingness about eye donation among first year medical (MBBS) students and first year General Nursing and midwifery (GNM) & first year BSc nursing students. *Materials and Methods:* This was a cross-sectional study by a semi-structured questionnaire undertaken in August 2019 among 106 first year MBBS students of a medical college of north Kolkata, eastern India, 40 first year GNM nursing students & 45 first year BSc nursing students of a nursing college situated within the premises of that medical college. *Results:* All the 191 students were aware about eye donation. Among them 143 students (74.87%) were willing to donate their eyes. Eighty nine (84%) medical students, 40 (100%) GNM nursing students and 43 (95.6%) BSc nursing students knew the ideal time of eye donation ($p=0.005$). Seventy five (70.8%) medical students, 39 (97.5%) GNM nursing students and 30 (66.7%) BSc nursing students were aware that cornea of the donor eye is used after eye collection ($p= 0.001$). On multiple regression analysis the willingness to donate eyes was significantly high among GNM students (OR 3.862; 95% CI: 1.262 to 11.817, $p= .018$) who acquired their knowledge mostly from the class lectures (27; 67.5%). *Conclusion:* Despite this high level of awareness and willingness there is a lacuna of knowledge regarding whom and how to approach for eye donation. Intense propaganda by observance of World Sight Day & National Eye Donation Fortnight in India and laying stress on Hospital Cornea Recovery Programs (HCRP) could improve the situation.

Keywords: Awareness, Corneal Transplantation, Eye Donation, Medical Students, Nursing Students.

Introduction

Corneal diseases constitute an important cause of visual impairment and blindness particularly in developing countries like India [1-2]. Corneal scarring due to keratitis or trauma are major causes of unilateral or bilateral corneal blindness in children and young adults [3]. Nearly 80% of all corneal blindness is preventable [4]. The Andhra Pradesh Eye Disease Study (APEDS) conducted in between 1996 and 2000 among three rural and one urban area of Andhra Pradesh, south India reported the prevalence of corneal blindness at 0.13% (95% CI: 0.06-0.24%), constituting 9% of all blindness [5]. Though strategies to prevent corneal blindness is more

cost effective, corneal transplantation or keratoplasty remains to be the major treatment option for patients who are already blind due to corneal diseases [6]. Approximately there are 18.7 million cases of blindness in India of whom 1,90,000 are blind due to bilateral corneal disease [7]. Each year another 20,000 cases are being added to the existing list [8].

The current number of procurement of cornea is about 22,000 per year but a significant proportion of donor corneas are unsuitable for corneal transplantation. The total numbers of keratoplasties performed are about 17,000 per year in India so the backlog of corneal transplantation is constantly increasing [9].

Ocular co morbidity like glaucoma and retinal diseases adversely affect the outcome of corneal transplantation and according to one Indian study only 40% of all bilateral corneal blindness is treatable with keratoplasty [10]. Calculated upon our available safe donor eyes, we would require 2,77,000 donor eyes to perform 1,00,000 corneal transplants per year in India [11]. With a current death rate of 7 per thousand, if only 10% of people pledge to donate their eyes and actually do so, it will be sufficient [12].

Corneal blindness significantly affects the younger population of the society with very high disability adjusted life years (DALYs) compared to cataract blindness [13]. So, the corneal transplants are expected to provide a higher social return than the cataract surgery.

To increase the procurement of cornea public awareness regarding eye donation is essential. Each year the period between 25th august to 8th September is observed as National Eye Donation Fortnight in India through organization of seminars, workshops and advertisement through electronic and print media regarding voluntary donation of eyes. Well informed medical and para-medical students are expected to influence eye donation rates. They are also the future

healthcare providers for the community. In this context we have planned to conduct a study regarding awareness, knowledge and willingness about eye donation among first year medical (MBBS) students of a medical college of north Kolkata, eastern India and first year General Nursing and midwifery (GNM) & first year BSc nursing students of a nursing college situated within the premises of that medical college

Material and Methods

This was a cross-sectional study undertaken in August 2019 among 106 first year medical students (71 boys and 35 girls) of a medical college of north Kolkata situated in eastern India, 40 first year General Nursing and midwifery (GNM) nursing students (all girls) & 45 first year BSc nursing students (all girls) of a nursing college situated within the premises of that medical college. The numbers corresponded to the students present in the class on that particular day and all of them responded to the study. After getting informed consent, a pretested, semi-structured questionnaire (given in the appendix) was self administered for collecting necessary information.

Appendix -Questionnaire (answer appropriately)		
Q1	Have you heard of eye donation previously?	Yes/No
Q2	What is the ideal time for eye donation?	a) Before death, b) within 6 hours after death, c) one day after death, d) don't know
Q3	Who can give consent for eye donation?	a) Only the donor person pledging before death, b) only the family members, c) friends, d) both a & b.
Q4	Which part of the eye is used after eye donation?	a) Whole eye, b) cornea, c) lens, d) optic nerve
Q5	Eye donation is applicable in case of disease of which part of the eye?	a) Retina, b) cornea, c) lens, d) optic nerve
Q6	Is the identity of the donor is revealed to the recipient?	Yes/No
Q7	Does the donor have to be hospitalized for eye donation?	Yes/No
Q8	Can donor eyes be preserved?	Yes/No
Q9	Are you willing to donate your eyes after death?	Yes/No
Q10	Can you name one eye bank in your state?	
Q11	What is your single most important source of information about eye donation?	
Q12	When eye donation fortnight is observed in India?	
Q13	World sight day is observed in which month of the year?	

It contained questions on awareness and knowledge regarding eye donation, their willingness to donate eyes and sources of information. The students' responses were entered and analyzed by the statistical software of SPSS (version 16.0). The results were expressed in proportion and p-value less than 0.05 was considered statistically significant. The study was registered with the Institution and approval obtained from the Institutional Ethical Committee.

Results

Overall, the responses of 191 first year medical and nursing students regarding eye donation were

assessed. Among them, 106 were first year medical (MBBS) students (71 boys and 35 girls), 40 were first year GNM nursing students (all girls) and 45 were first year BSc nursing students (all girls). Seventy one students were boys and 120 students were girls.

In response to the question number 1 all the students (n=191) answered that they have heard about eye donation previously which was accepted as 100% awareness. Table 1 summarizes the responses of the students to all the questions except question number 1, 9 & 11.

Question number	MBBS (n ₁ = 106) No (%)	GNM(n ₂ = 40) No (%)	BSc(n ₃ = 45) No (%)	p value
Q2.What is the ideal time for eye donation?	89 (84.0)	40 (100.0)	43 (95.6)	0.005
Q3.Who can give consent for eye donation?	38 (35.8)	14 (35.0)	13 (28.9)	0.703
Q4.Which part of eye is used after eye donation	75 (70.8)	39 (97.5)	30 (66.7)	0.001
Q5.Eye donation is applicable in case of disease of which part of eye?	60 (56.6)	04 (10.0)	12 (26.7)	0.000
Q6.Is the identity of the donor is revealed to the recipient?	30 (28.3)	01 (2.5)	15 (35.3)	0.000
Q7.Does the donor have to be hospitalized for eye donation?	44 (41.5)	32 (80.0)	08 (17.8)	0.000
Q8.Can donor eyes be preserved?	77 (72.6)	38 (95.0)	30 (66.7)	0.004
Q10.Can you name one eye bank in your state?	13 (12.3)	03 (7.5)	00 (0.0)	0.044
Q12.When eye donation fortnight is observed in India?	03 (2.8)	00 (0.0)	00 (0.0)	0.294
Q13.World sight day is observed in which month of the year?	19 (17.9)	00 (0.0)	00 (0.0)	0.000

Question number 2 was regarding the ideal time of eye donation. Eighty nine (84%) medical students, 40 (100%) GNM nursing students and 43 (95.6%) BSc nursing students responded correctly (i.e. within six hours after death), results

being statistically significant (p=0.005). Very few students of all the categories gave correct answer about the consenting person for eye donation (38; 35.8% medical students, 14; 35% GNM nursing students, 13; 28.9% BSc

nursing students) as consents of both the donating person (pledged before death) and family members are required (Question no.3). Responses were not statistically significant.

Most of the students were aware that cornea of the donor eye is used (Question no.4) after eye collection (75; 70.8% medical students, 39; 97.5% GNM nursing students, 30; 66.7% BSc nursing students, p= 0.001). But, the GNM and BSc nursing students were mostly ignorant about the fact that only the diseased cornea (Question no.5) can be treated by eye donation (only 4; 10% GNM nursing students, 12; 26.7% BSc nursing students answered correctly) as opposed to 60 (56.6%) medical students with a statistically significant result (p=0.000). Only 1(2.5%) GNM student knew that the identity of donor is not disclosed to the recipient (Question no.6). The responses of medical (30; 28.3%) and BSc nursing students (15; 35.3%) were slightly better (p= 0.000).

Most GNM Students (32; 80%) were aware that the donor person need not be hospitalized for eye donation (Question no.7) in comparison to medical (44; 41.5%) and BSc nursing students (08; 17.8%). Results were also statistically significant (P=0.000). All the categories of students knew fairly well that the donor corneas can be preserved (Question no.8) before

transplantation (77; 72.6% medical students, 38; 95% GNM nursing students, 30; 66.7% BSc nursing students, p= 0.004). Very few students (13; 12.3% medical students, 03; 7.5% GNM nursing students and no BSc nursing student) could name an eye bank in the state of west Bengal in eastern India (Question no.10), the results being statistically significant (p=0.044).

Only 3 (2.8%) medical students and none from GNM and BSc nursing students could answer correctly (Question no.12) about the time of observance of eye donation fortnight in India (i.e. from 25th August to 8th September). This result was statistically insignificant (p=0.294). Regarding observance of world sight day 19 (17.9%) medical students gave correct response (Second Thursday of October. Question no.13) but none from GNM and BSc nursing students answered correctly (p=0.000). Among 191 students 143(74.87%) were willing to donate their eyes. We have applied multiple logistic regression analysis on willingness to donate eyes (Question no.9) in respect to gender and course of study [Table 2]. It was observed that willingness to donate eyes is significantly high among GNM students (OR 3.862; 95% CI: 1.262 to 11.817, p= .018).

Table-2: Effect of gender and course of study on willingness to pledge eyes for donation (Question no. 9) by multiple logistic regression

Characteristics	Total	Willing N (%)	Odds ratio for being willing	95% CI	p value
Gender					
Male	71	49 (69.01)	1		
Female	120	94 (78.33)	2.694	(0.922 to 7.870)	0.070
Study Course					
MBBS	106	79 (74.53)	1		
GNM	40	35 (87.50)	3.862	(1.262 to 11.817)	0.018
BSc	45	29 (64.44)	1.167	(0.308 to 4.420)	0.821

The single most important source of information regarding eye donation (Question no.11) was summarized in Table 3. Internet was the commonest source of information (31; 29.25%) among MBBS students whereas GNM students acquired the knowledge mostly from their class

lectures (27;67.5%). BSc nursing students cited news papers & magazines (13;28.88%), television (11;24.44%) and family members (10;22.22%) as leading sources of information.

Source	MBBS N (%)	GNM N (%)	BSc N (%)
Family members and friends	09 (8.49)	02 (5.00)	10 (22.22)
Doctors and other medical personnel	18 (16.98)	01 (2.50)	03 (6.66)
Internet	31 (29.25)	0 (0.00)	04 (8.88)
Television	10 (9.43)	0 (0.00)	11 (24.44)
News papers, Magazines	21 (19.81)	10 (25.00)	13 (28.88)
Class	17 (16.04)	27 (67.5)	04 (8.88)

Discussion

The eye banking services have remained underdeveloped in developing countries like India due to scarcity of trained human resources, restrictive laws, expensive long-term storage media, poorly followed medical guidelines and sociocultural barriers regarding organ donation. At present over 700 eye banks are registered in India performing a total of around 17,000 keratoplasties per year [14]. This is far less than the annual target of 1,00,000 transplants by the year 2020 adopted by the National Programme for control of Blindness of India and other Non Government Organizations [14].

To achieve this goal, mere awareness and willingness to donate eyes is not enough. Relatively high levels of awareness and willingness have been reported by various population based Indian studies from Delhi (55.4% and 41.5%), Tamil Nadu (awareness of 50.7%), rural (30.7%,32.9%) and urban (73.8% and 44.9%) Andhra Pradesh [2, 15-17]. A study among adult population in Singapore showed that 80.7% of participants were aware about eye donation and 67% were willing to donate their eyes [18]. Malaysia, a south east country, has to depend mainly on foreign donor corneas (USA: 71%, Sri Lanka: 17%) and local donors contribute only 12% of the total collection [19].

Though, 86% of university students of Malaysia are aware of eye donation only 27% are willing to donate their eyes [19]. Much better responses about awareness and willingness about eye donation have been obtained among well informed medical, paramedical and secondary students from Delhi (99.4% and 87.2%), Bangalore (96.8% and 85.1%) and Kolkata (81% aware about eye donation) in India [9, 20-21].

There was no previous study in eastern India regarding willingness to eye donation in medical and paramedical student population. In our study it is revealed that all of the MBBS, GNM and BSc nursing students are aware about eye donation and 74.87% of them are willing to donate their eyes. The GNM students show a significantly high rate of willingness to donate eyes (OR 3.862; 95% CI: 1.262 to 11.817, p= .018). It is also important to observe that they mostly gathered their knowledge regarding eye donation from the class lectures (27;67.5%) highlighting the role of teachers and the course curriculum.

Regarding the knowledge about ideal time for eye donation our students performed fairly well (84% MBBS, 100% GNM and 95.6% BSc nursing students answered correctly. p= 0.005). A study on medical students in Delhi showed correct responses in 63.3% students [22]. Malaysian medical students in a similar study gave correct answer in 46.59% cases [19]. Secondary level students in Kolkata answered correctly in 32.1% cases [21].

Most of our students know that cornea is used following eye donation (70.8% MBBS students, 97.5% GNM students and 66.7% BSc nursing students). Dhaliwal (2002) and Singh et al (2007) found similar results in two studies on medical students in Delhi (100% and 86.1% respectively) [20, 22]. But, despite this high level of awareness and willingness about eye donation in reality the figures for eye donation in India is very low, even though the country has a death rate of 7 per thousand of individuals [12,23-24].

The typical Indian eye bank operation is a voluntary program focusing on general public

awareness and responding to family requests to perform recoveries. A new active approach is taken in the form of establishment and development of professional eye bank managers and institution of Hospital Cornea Recovery Programs (HCRP), where trained eye donation counselors are stationed in large hospitals round the clock to approach potential donor families to gain consent for eye donation. The doctors and nurses on duty have added responsibility to make this program successful. This model is now running efficiently in 8 model eye banks in the country since 2009 with annual internal growth rates of 34% (2010-5 eye banks) and 20% (2011-8 eye banks) performing a total of 5600 transplants per year which is 31% of all transplants in India [14].

This model has also resulted in better utilization of tissue (72%) in 8 such model eye banks than the overall Indian eye bank utilization of tissue (38%) collected through primary voluntary approach. In a study in Delhi in 10 hospitals under HCRP, Eye Donation Counselors (EDCs) had approached next of kins of 407 potential eye donors where 168 (41%) consented for eye donation though 360 (88.45%) participants were aware about it [25]. The fear of tissue being sold, wasted or illicit trafficking were the most frequent barrier (32.25%) for eye donation followed by concern about the disfigurement of the deceased (23.67%) [25].

It is revealed from our study that there is a lack of knowledge about the consenting person for eye donation, naming of an eye bank in the state and observance of World Sight Day & Eye Donation Fortnight in India. Very few students of our study have the knowledge of the consenting person for eye donation (35.8% MBBS students, 35% GNM students and 28.9% BSc nursing students). There are no comparative data available from other studies.

Only few students could name an eye bank in our state (12.3% MBBS students, 7.5% GNM

students and 0% BSc nursing students). Such poor result was also obtained from Malaysian medical students (4.99%) but medical students in Delhi performed fairly well (67.4%) [20]. This indicates that though most of our students are willing to donate their eyes they do not know where and how to approach for eye donation.

To increase the public awareness for eye donation each year the period between 25th August to 8th September is observed as National Eye Donation Fortnight in India through organization of seminars, workshops and advertisement through electronic and print media regarding voluntary donation of eyes. The World Sight Day is observed worldwide in the second Thursday of October each year to highlight the importance of prevention of blindness and restoration of vision by corneal transplantation following eye donation in suitable cases.

Conclusion

In conclusion, the medical, paramedical and students of other fields represent a young, well educated, active group who can potentially influence the eye donation rates by motivating the public they come across in whichever field they work in future. The duty of a good citizen to donate eyes and other organs after death along with blood donation during life could be incorporated in their "civics" study curriculum in the secondary level.

Intense propaganda by observance of World Sight Day & National Eye Donation Fortnight in India and laying stress on Hospital Cornea Recovery Programs (HCRP) can convert the high level of awareness and willingness to donate eyes into actual eye donation accomplishing the desired goal to cure corneal blindness in the society.

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

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Cite this article as: Saha M, Bandyopadhyay S, Das D and Ray TG. Awareness, knowledge and willingness about eye donation among first year medical and nursing students of a medical and nursing college of north Kolkata, India. *Al Ameen J Med Sci* 2020;13(3):210-216.

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