

A vision behind hospital corneal retrieval programme in the context of eye donation: An Indian scenario

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Abstract: Corneal blindness stands as a second cause of blindness in many developing countries of Africa and Asia, including India. There are approximately 6.8 million corneal blind (unilateral) and millions are bilateral corneal blind. The lost vision can be regained through the procedure of corneal transplantation. The paper illustrates the medical concern and health programme for enhancing the number of corneal transplantation and to improve the quality of life among corneal blind population. Hospital Corneal Retrieval Programme (HCRP) as an initiative of National Programme for Control of Blindness and Visual Impairment (NPCBIV) and Eye Bank Association of India (EBAI), facilitates eye banks in retrieving corneas from hospital. The paper addresses the intersection of National Health Programme and institutional support of hospital in elevating the rate of corneal transplantation. The aim of the paper is to overview the relevance of HCRP in enhancing the life of corneal blind population through corneal transplantation.

Key Words: Corneal blindness, corneal transplantation, HCRP, Institutional support and Medical concern

1. INTRODUCTION:

Loss of vision or blindness has an effect on psychological, personal, social and economic life of the blind population in society¹⁻². The problem of spatial understanding, adapting 'Blindism' (inappropriate non-verbal behaviour) and comprehending the non-verbal behaviour of sighted people among blind population diminish their confidence, physical mobility, personal development and social interaction with other sighted people³. People with visual disability are excluded to perform many activities of everyday life, like walking, cooking, assessing building or transportation, shopping etc without any support due to stereotypical attitude of sighted population in the society. They have to depend on others, especially their family members for providing care, treatment and prevention. It is responsible for their exclusion in education which further impedes their potentiality of earning and ability of doing jobs which require sight³⁻⁵. It is observed that sighted people, even their family members perceive the blind person as an unfit for social interaction⁶. The blind person confronts difficulties in finding a suitable mate from sighted population, especially for blind women⁶⁻⁷.

Blindness covers both direct and indirect costs which affect the economic life of blind people and their family. Direct costs comprise expenses on the diagnosis and treatment of blindness and visually impairment in the hospital. Indirect costs include the loss in the earning of blind people and their family members. The cost applied for assistant aids or devices, transition in home and health care services at home is also incorporated in indirect costs⁸⁻⁹. The Government is accountable for providing treatment to blind persons and rehabilitating them. It generates extra financial burden on the health budget of the country. The immense number of blind population in any country is an evidence of poor socio-economic development and deficient health services¹⁰.

It is estimated that there are around 285 million visual impaired people including 39 million blind people worldwide¹¹. About 90% of visual impaired and blind population is found in developing countries, including Sub-Saharan Africa, China and India⁸. Corneal blindness is one of the major causes of blindness in India. Along with poverty, enormous population with limited resources and poor quality of eye care services can make the situation more critical. Eye related diseases like keratitis, infection, aftermath of surgery, vitamin A deficiency, accidental injury and use of traditional eye medicine are responsible for corneal blindness¹².

According to National Programme for Control of Blindness (NPCB), there are about 12 million blind people in India¹³. Approximately 6.8 million people are unilateral corneal blind (blind from one eye) and one million people are bilateral corneal blind (blind from both eyes). There is an addition of 25,000 to 30,000 new cases of corneal blind in the backlog annually¹³⁻¹⁴. The number of corneal blindness is estimated to increase up to 10.6 million by 2020¹³. Nearly 80% of corneal blindness is preventable and treatable. The lost vision can be restored through corneal transplantation¹⁵. The number of corneal transplantation is not meeting the annual need of about 277,000 corneas. There is a considerable variation in demand and supply of donated corneas due to the paucity of donated corneas. It will be resulted in the waiting period of one to two year on an average for corneal transplantation among corneal blind patients¹⁶. The present

paper addresses the medical concern and health policy for enhancing the number of corneal transplantation and improving the quality of life among corneal blind population.

2. AIM OF THE STUDY:

The aim of the paper is to underline Hospital Corneal Retrieval Programme (HCRP) in bringing institutional support for elevating the number of corneal transplantation in India.

3. METHODS AND MATERIALS:

This paper is based on the review of secondary data composing of literature related with corneal blindness, corneal transplantation, health policies and statistical reports of NPCBVI and SightLife India. Data bases of Google search, Google scholar, ResearchGate, International Journal of Ophthalmology and websites like WHO, NPCBIV, Eye Bank Association of India and SightLife were extensively searched. Keywords, such as 'medical concern', 'NPCB', 'relevance of HCRP in India', 'corneal transplantation', 'functioning of eye bank' and 'SightLife India' was used to study the role of health programme in the sustainable functioning of eye bank. Retrieved studies were relevant for research objective and written in the English language were selected and analysed.

4. ANALYSIS AND DISCUSSIONS:

The results and discussions constitute of three sections. The first section deals with medical concerns about corneal blindness and corneal transplantation. The second section discusses health policies programmes regarding corneal transplantation. The last section describes the intersection of medical concerns and health programme in the context of sustainable development. This section also encapsulates the relevance of health programme in the domain of corneal transplantation. Tables and graphs are used to describe the transformation in the retrieval of cornea and corneal transplantation. The results and discussions are as follow:

A. Medical concerns in the context of corneal transplantation:

Corneal blindness can be prevented with timely treatment and accessibility to healthcare facilities. With the medical and technical advancement in the field of surgeries, corneal transplantation emerges as an option for the treatment of corneal blindness. Corneal transplantation enables the damage cornea to be replaced with healthy cornea of eye donor. It is utterly depended on the retrieval of corneas from deceased through the procedure of eye donation. It has a highest success and lowest graft rejection rate with the advent of new immunosuppressive drugs and storage media for maintaining viability of donated corneas¹⁷⁻¹⁸. Although corneal transplantation is institutionalized in the field of medicine, predominantly organ transplantation, yet corneal blindness still remains a health issue in India.

Gupta et al. (2018) identified social and medical determinants for the insufficient number of corneal transplantation, such as inadequate number of donated corneas, poor quality of donated corneas, insufficient number of trained healthcare professionals, shortage of fund, inadequate infrastructure and facilities of eye bank¹⁹. The wide disparity between demand and supply of donated corneas displays a concern for ophthalmologists and healthcare professionals working in the dynamics of eye donation and corneal transplantation.

The concern includes medical care or attention, rehabilitation and corneal transplantation of corneal blind patients for restoring their lost vision and enhancing their life¹³. It also encompasses sufficient amount and quality of infrastructure, facilities and trained manpower in the health setting. There is a need to develop effective, efficient and financially relevant health system²⁰. There is reluctance among people regarding eye donation due to number of reasons, such as perception about death and body after death, born blind in next birth, facial disfigurement, religious belief, lack of awareness and distrust in health setting²¹⁻²². Excessive community support and participation is required to promote eye donation and preventing corneal blindness among people. Effective health promotion and awareness strategies are required to promote eye donation and corneal transplantation in the society¹³.

B. Health programme and policies in context of eye donation and corneal transplantation:

In order to reduce the backlog of blindness from 1.4% to 0.3% by 2020, National Health Mission (NHM) has launched National Programme for Control of Blindness and Visual Impairment (NPCBVI) as centre sponsored programme in 1976²³. NPCBVI provides guidelines for the smooth functioning of eye bank, financial assistance to eye bank and establishing coordination between eye bank and eye donation centre. It is recurring financial assistance in making arrangement for medicine, furniture and equipment for the dynamics of eye donation and corneal transplantation. It is also providing financial support through paying Rs 2000/- per pair of donated corneas in the form of recompense as a professional service of eye bank staff²⁴⁻²⁵.

Various activities initiate to spread awareness on eye donation and reduce the burden of corneal blindness in the society. For example, recruitment of human resources, such as ophthalmic surgeons and eye donation counsellors (EDCs), celebrating the National Fortnight from 25th August to 9th September and World Sight Day yearly, providing

training to healthcare professionals, using Information education and communication (IEC) - social and electronic media etc.²⁴⁻²⁶ NPCB is running these activities in coordination with non-government organizations, such as Eye Bank Association of India (EBAI), SightLife India, ORBIS etc. to strengthen the model of public private partnership in the movement of eye donation in India²⁶.

EBAI proposed the effective strategy 'Hospital Corneal Retrieval Programme (HCRP)' while addressing the issue of non-availability of healthy donated corneas. The Ramayamma International Eye Bank had initiated HCRP in 1990 for promoting eye donation and corneal transplantation through motivation and grief counselling in the hospital²⁷⁻²⁸. With the success of HCRP in the Ramayamma International Eye Bank, the number of corneal transplants had increased in the year 2003-2004 from the year of 1995-1996 by 72.5%²⁰.

HCRP is functioning in many secondary and tertiary hospitals where large number of death occurs for institutional support from hospital to eye bank²⁷⁻²⁸. NPCBVI has been appointing EDCs under HCRP in the hospital where eye bank is functioning. Healthcare professionals, such as doctors, nurses and other para-medical staffs of different wards or departments inform EDCs about the death of ill patients or accident victims in the hospital. EDCs approach the primary kin of deceased and counsel them for donating the eye of deceased²⁶. There is a decline in the time interval between the death and cornea retrieval of donors. Accessibility of medical record of donor, availability of good quality corneas from younger donors and cost effectiveness also improve the rate of corneal transplantation²⁷⁻²⁸.

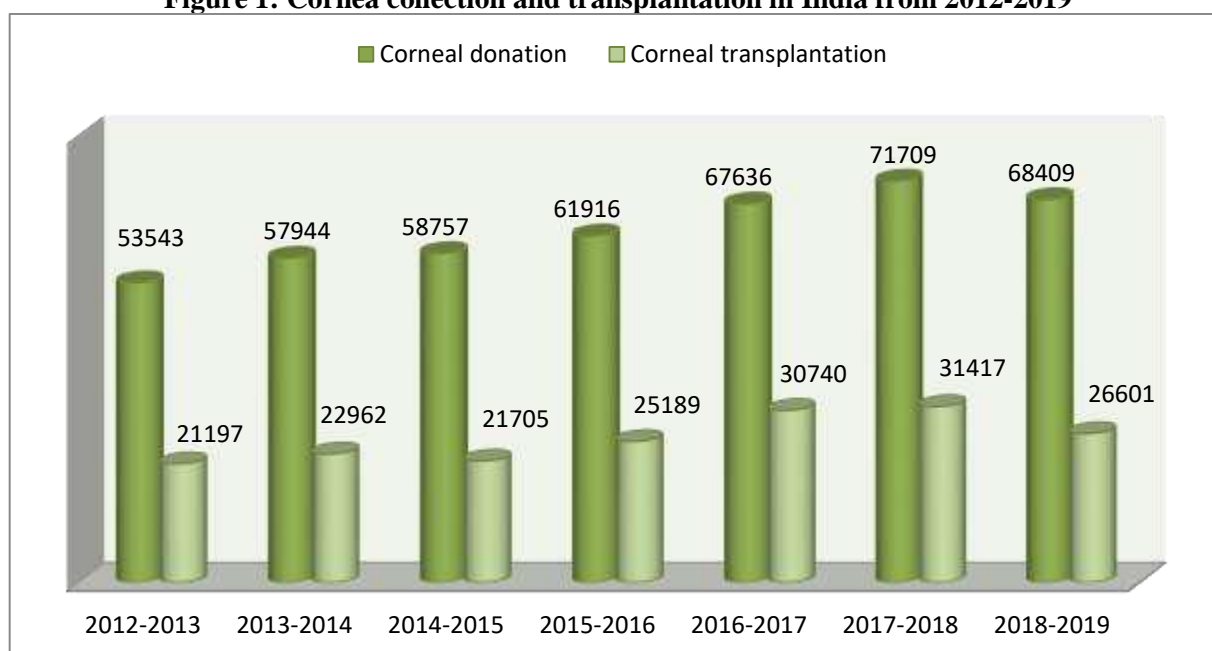
C. Intersection of medical concern and health programmes in the Sustainable Development of eye banking: The

endorsement of health programme, such as NPCB and HCRP in the context of sustainable growth of eye banking is the major medical concern. NPCB endeavours in providing equal accessibility to all without any distinction in healthcare setting. It strengthens infrastructure, provides guidelines and financial assistance, recruitment of human resources and conducts training in promoting corneal transplantation. According to the achievement of NPCB in the 11th five year plan, a total of 221351 eyes collected, training provided to 1850 Ophthalmic Surgeons, 82 eye banks and 177 eye donation centers strengthened, 126 medical colleges and district hospitals developed and 44 eye wards and eye OTs supported²⁴.

NPCB needs to involve different voluntary organization, such as EBAI and SightLife India, through public private partnership for community participation¹⁹. EBAI is considered as an umbrella of all eye banks working in India to carry out the movement of eye bank. It acts as resource centre to improve the services and coordinates the activities of all its eye bank members at national level. It is conducting awareness programmes for the promotion of eye donation in the society²⁹⁻³⁰.

The SightLife India is an international voluntary organization functioning in India to eradicate corneal blindness and promote corneal transplantation through recruiting human resources, capacity building of human resources and funding. It is organizing these activities in collaboration with NPCB and EBAI. It initiates HCRP in eye banks which are performing effectively in the field of eye donation³¹.

Figure 1: Cornea collection and transplantation in India from 2012-2019



Source: Directorate General of Health Services³² (2020)

It is evident that there is a rise in the rate of eye donation and corneal transplantation in India from 2012. Approximately 27.76% of rise was found in the number of donated corneas in the year of 2018-19 from the year of 2012-2013. Despite of increase in the number of donated corneas, there was a decline in the utility rate of donated corneas from 39% (in the year of 2012-2013) to 38.88% in the period of 2019-2020 (see fig.1).

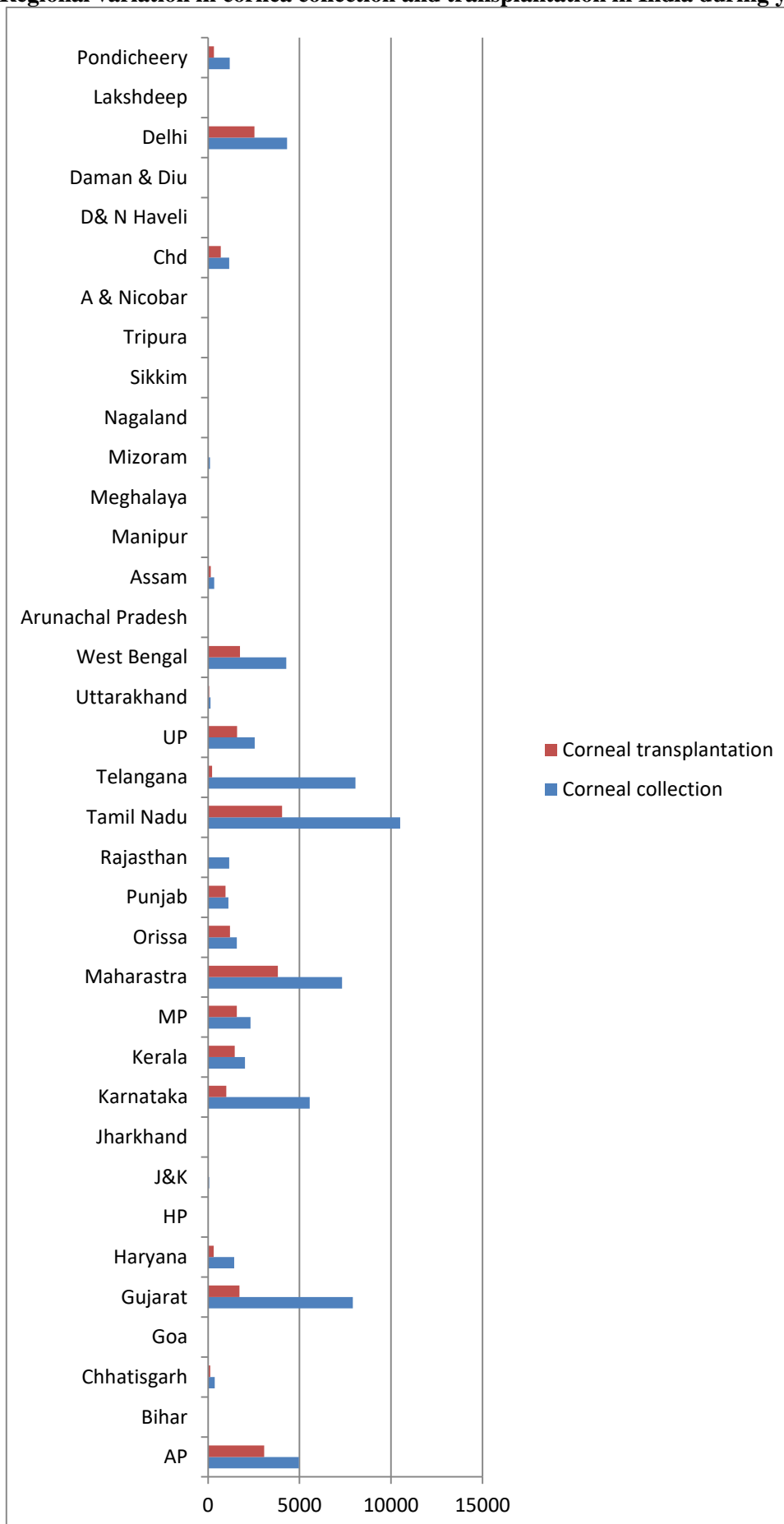
Oliva et al. (2012) recognized the growth in the retrieval of corneas and corneal transplantation in eight eye banks of India since 2009. Nearly five eye banks in 2010 and eight eye banks in 2011 supported 5,600 transplants. The development of professional eye bank managers and HCRP were key factors for this rise. According to the Eye Bank Association of India, approximately 72% of utilization of donated corneas was through HCRP model and 38% through voluntary donation in eight eye banks³³. The cross sectional study of Acharya et al. (2019) also identified multiple factors for boosting the number of eye donation, such as grief counselling, HCRP, public awareness about eye donation³⁴.

Gogia et al (2015) found that there was an increase in the number of corneal transplantation in 2008 and 2011 as compared to 2003 in north India. The data of eye bank of North India of the year 2003, 2008 and 2011 was examined to study the pattern of corneal utilization. With slightly increase in eye donation, medical advancement, monitoring, evaluative system and documentation, the rate of corneal utilization had increased in last eight years. Approximately 70.06% of donated corneas were utilized in 2008 and 68.29% of donated corneas were utilized in 2011, while 65.08% were utilized in 2003. The authors identified the need to modify health policies to improve the quality of donated corneas³⁵. There was a regional variation in the rate of corneal collection and transplantation in India in the year of 2018-19 (see fig. 2).

Dafne et al. (2013) found that most of eye banks are functioning in urban areas as compared to rural areas in the Marathwada region of Maharashtra in India. The study did not find any definite reason for the increase or decrease in the number of corneal retrieval in different eye banks of the selected region for study. More eye banks with adequate and sufficient infrastructure and facilities should be created in both urban and rural regions³⁶.

Sharma et al. (2018) conducted a retrospective study in the eye bank of IG Medical College, Shimla, Himachal Pradesh. The data from 2011-2016 on eye donation and corneal transplantation was analysed. A total of 200 corneas were retrieved during this period. About 182 corneas were retrieved from hospital and 18 corneas were collected from home on the basis of voluntary donation. The majority of donors belonged between the age of 60-80 years, and 41-60 years. Healthcare professionals of hospital, especially female played an important role in motivating family members of donors and encouraging female family members of deceased in the decision of eye donation. The findings described the reluctance among family members to donate the eye of their young deceased relative. Lack of awareness, facial disfigurement, fear of being born blind in next birth and diseased status of corneas were identified as factors that influence elder and rural population. Climatic and geographical condition further created problems in the promotion of home based voluntarily eye donation. HCRP could play an important role in the availability of corneas and overcome the climatic and geographical problem in the context of home based eye donation. Young population should be focused while planning for awareness programme on eye donation. Active involvement of non-voluntary organization and electronic media could bring improvement in spreading awareness among rural people³⁷.

Figure 2: Regional variation in cornea collection and transplantation in India during year 2018-19



Source: Directorate General of Health Services³² (2020)

Table 2: Corneal collection and transplantation in Chandigarh from 2012 to 2019

Year	Cornea collection	Cornea transplantation
2012-13	457	352
2013-14	727	529
2014-15	415	261
2015-16	950	602
2016-17	1081	651
2017-18	1169	676
2018-19	1150	698

Source: Directorate General of Health Services³² (2020)

Table 2 illustrates the variation in the collection and transplantation of corneas in Chandigarh onward the year of 2012-2013. There was a rise in the rate of corneal collection (151.64%) in the year 2018-19 from the year of 2012-13. While the utilization rate of corneal collection in the year was not growing akin to the period of 2012-13. The utilization rate of corneal collection during the year 2018-19 was about 60.69% as compared to 77.22% of corneal collection in the year of 2012-13.

A total of 312, 324 and 274 corneas were collected in the three periods from February 2011 to January 2014 in Post Graduate Institute of Medical Education and Research, Chandigarh. During the period of 2014-15, there was a rise of 68% in the collection of eyes (510 corneas). The reason behind this rise was the role of EDC in providing the grief counselling to relatives of deceased and intimation of death by healthcare professionals like nurses of different wards of the hospital where death occurred. This increased the opportunity of making the request for eye donation and decreased the time interval between death and corneal retrieval of donor³⁸.

The study of Raj et al. (2018) showed that about 82.50% donors were above the age of 60 years. Approximately 59.4% of donated corneas were retrieved through the efforts of EDCs. There was a limited use of HCRP in the context of eye donation and utilization of donated corneas. Cause of death, such as tuberculosis, sepsis, carcinoma etc., and unsuitable serological report on HIV, Hepatitis B and C and poor quality of donated tissue were identified as factors which influenced the utilization of donated corneas³⁹.

Table 3: Growth in corneal transplantation in three eye banks of Delhi

Year	Corneal transplantation
2011	298
2012	472
2013	976
2014	1101
2015	1309
2016	1478

Sources: SightLife India, 2019³¹

Table 3 highlights the rise of corneal transplantation through the adoption of HCRP in three hospitals of Delhi (AIIMS, Guru Nanak Eye Centre and Dr. Shroff Charitable Eye Hospital) as a joint project with the partnership of SightLife India³¹. According to analysis of SightLife India partnership eye banks, HCRP played an important role in improving the utility rate of donated corneas⁴⁰.

The study of Gyanchand (2017) analysed the record of eye donor of Lions International Eye Bank in Bangalore from 2005 to 2010. Approximately 7363 corneas were received from residence and hospital. The number of eye donation had increased from hospital as compared to residence in last three years. Awareness programmes played an important role in increasing the number of eye donation. Corneas from young donors were retrieved from hospital in comparison to home. Corneas from the above 70 year of donors were collected from home than hospital. This resulted in better quality and utilization of donated corneas from the hospital in comparison to residence⁴¹.

The study of Venugopal et al. (2015) identified the potentiality of HCRP in improving the rate of corneal donation at Sri Chamarajendra district hospital, HIMS, Hassan, Karnataka, India like other South Indian states, predominately Andhra Pradesh, Tamil Nadu and Maharashtra. EDCs could approach the relative of deceased in about 86% of deaths in the hospital which enhanced the probability of more eye donation from the hospital⁴². Jadeja and Bhatt

(2017) also noted that the quality of donated corneas could be improved with the proper implementation of HCRP and guidelines of eye banking⁴³.

5. CONCLUSION:

There is an increase in the number of eye donation and corneal transplantation in India. Yet it does not meet the annual requirement of cornea. Even the rate of corneal transplantation varies from region to region in India²⁰. For example, a total of 11204 corneas were collected and 5043 corneas were transplanted in Tamil Nadu, while about 93 corneas were collected and 73 corneas were transplanted in Himachal Pradesh during the year 2016-2017³². Despite of potentiality in increasing the number of donated corneas and improving the quality of collected corneas, there was a limited use of HCRP^{37, 39, 42 & 43}. Health is a combination of both subjective and objective dimensions which include feeling, choice to behave and presence of physical pathology. The conversion of these dimensions into health programmes and practices will produce appropriate result⁴⁴. Health programme should match with the expectation of people for public compliance in the community⁴⁵. The model of public and private partnership in the dynamics of eye donation and corneal transplantation is essential for sustainable development of eye banking activities. NPCB along with voluntary organizations is working in the arena of public compliance through awareness activities²⁰. Counsellor can play an effective role in spreading awareness about the requirement and benefit of corneal transplantation. The coordination between EDCs and healthcare professionals, especially nurses of hospital will improve the current scenario. The speeding of the medico-legal formalities in the context of eye donation will improve the quality of donated corneas⁴⁶.

The convergence of medical concerns and health policies is pursuing to provide institutional support and bridge the gap between the demand and supply of needed corneas. With the raise in the number of corneal transplantation and improvement in the quality of receiving donated corneas, large number of corneal blind people regains their lost vision, gets freedom from pain and improves their facial appearance through corneal transplantation⁴⁷. The success of corneal transplantation relies on the both medical and social determinants, such as eye disease of recipients, quality of transplanted corneas, follow up care after transplant, socio-economic status of recipients and eminence of surgeon in surgery⁴⁸⁻⁴⁹. The Follow up care after corneal transplant is an essentially significant in sustaining the survival rate of transplantation. About 50% of corneal recipients lose post operative follow up within 12 month due to time and cost involved in the treatment, corneal transplantation and follow up care. There is a need of developing strategies to resolve the issue and provide appropriate follow up care³¹.

Few studies are available in the context of survival outcome of corneal transplantation. There is a need of in-depth sociological study to explore the social, regional, economic, medical, legal and political determinants in understanding and finding solution for resolving issues in the dynamics of eye donation and corneal transplantation.

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