

*Editorial*

# Corneal blindness and eye banking: Current status and challenges ahead

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Corneal blindness is the second most common cause of preventable blindness in India. It is estimated that more than 1.3 million people are affected with bilateral corneal blindness. Around 10.6 million were reported to suffer due to unilateral corneal blindness in 2020, having vision less than 6/60. The global statistics revealed bilateral corneal blindness in 5.5 million cases, while unilateral blindness and visual impairment may be more than 20 million.<sup>1</sup>

China and India share a big burden of almost 49% of the world's total quantum of blindness and vision impairment, proportionally much higher than their share of 37% of the world population.<sup>2</sup>

The prevalence of corneal blindness ranges between 4 and 6% among all causes of blindness in India with much higher engagement in third-world countries and the African continent. The common causes of corneal blindness are injuries including occupational and environmental hazards, domestics, sports, infections including trachoma, infectious keratitis of viral, bacterial, or fungal, xerophthalmia congenital dystrophies, and degeneration as well as iatrogenic as a sequelae of surgical procedures or complications. The most common fungi involved in corneal blindness are *Candida*, *Aspergillus*, and *Fusarium*, with *Aspergillus* being the most common in India.<sup>3,4</sup> Corneal transplantation is the only known cure for corneal blindness, however, the number of eye donations in India is low due to a lack of awareness and myths and fears about eye donation. Around 10 million deaths occur every year in India. However, the number of corneal collections was 55,260 in 2019, and its utilization was only 26,416. The COVID-19 period witnessed a major setback in tissue collection. The corneal collection dropped to

21,493, and corneal transplants were 13,323 in 2020. Despite an increase in the corneal collections in subsequent years, we have to attain the level of the pre-COVID-19 period. As per the available cumulative data with EBAI and Govt of India, 47,676 corneas were retrieved and 29,057 were utilized in the year 2023, which is much less than the need of around 100,000 corneal transplantations per year to clear the backlog.

Keeping the prevailing utilization rate of corneal tissue around 60%, India needs to set a target to collect at least 200,000 corneas per year. Hence, meticulous planning and resources have to be galvanized to clear this backlog.<sup>5,6</sup>

Dr. Eduard Konrad Zirm, an Austrian Ophthalmologist, performed the first full-thickness human corneal transplant on December 07, 1905. Dr. R. Townley Paton and Dr. Ramon Castroviejo have the distinction of pioneering corneal transplant surgery in New York, in 1937. Dr. R. Townley Paton founded the first eye bank in New York City, USA in 1944. Dr. R.E.S Muthayya performed the first corneal transplant in India in 1948. He also established the nation's first eye bank in 1945 in the Regional Institute of Ophthalmology and Government Ophthalmic Hospital in Chennai.<sup>7</sup>

Eye Bank is a community nonprofit, charitable organization dedicated to restoring sight to those who are blind or visually impaired through promoting and advancing Eye donations. The Eye Bank Association of America (EBAA), founded in 1961, remained the first and leading eye bank across the globe. The concept of the Eye Bank Association was conceived in the USA in the early sixties to provide a common platform and to act as a facilitating agency to promote eye banking, set standard protocols, and develop a bridge among all the

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stakeholders, including government agencies for the singular cause of handling the burden of corneal blindness.<sup>8</sup>

The Eye Bank Association of India (EBAI) was formed in 1989. The Eye Bank associations across the globe are instrumental in propagating awareness, and catalysts to develop a platform of technology transfer, skill development, accreditation, and tissue distribution systems in the country. The eye banks also play a crucial role as an interface among all stakeholders including global coordination of eye banking activities.<sup>4,9</sup>

The EBAI is one of the largest professional bodies of eye bankers, tissue collection centers, corneal surgeons, non-governmental organizations (NGOs), and other nonprofit organizations worldwide engaged with the cause of the promotion of corneal tissue collection and transplant of tissues.

EBAI has a membership of more than 2500 members, including 941 Eye Banks and ERCs registered and 915 corneal surgeons. EBAI has very strong affiliations with the GAEBA (Global Alliance of Eye Bank Associations) and AEBA (Association of Eye Banks of Asia) to coordinate the process of standardization of the Eye Banking guidelines.

EBAI also participates in activities to upgrade the training of the technicians, eye bankers, the central corneal tissue distribution system (CDS), supply of preservative media as well as an interface with the government of India, respective state authorities, and eye bankers in the process of policymaking, accreditation, and issues linked with the THOTA (The Transplantation of Human Organs and Tissues Act,) and other governmental regulations and acts.<sup>9</sup>

The eye bank is a link between the donor family and a cornea recipient to procure quality tissue through voluntary donations or HCRP (Hospital Cornea Retrieval Program). Eye Banks also screen and evaluate eyes or tissue as per eye bank standards and ensure the suitability of the tissue by initiating testing to rule out HIV, Hepatitis, and other contraindications as per the norms and guidelines.<sup>9,10</sup>

The eye banking activities in India have shown quantum improvement in the process of accreditation, upgradation, and training in a decade or so. The avenues for training corneal surgeons and eye bank technicians have shown a remarkable positive trend.

Eye banking accreditation has been introduced in collaboration with the National Accreditation Board for Hospitals (NABH) to develop uniform standards of quality control of operative procedures and technical aspects that are at par with the international quality control standards.

India has shown a significant shift toward focused HCRP programs from the voluntary base nonhospital collection

of the cornea. There is a quantum jump of 20% increase in tissue utilization after starting HCRP in 2004 in India. The amendment in the THOA Act in 2011 has categorized cornea as a tissue rather than an organ, thereby facilitating the collection by allowing trained technicians the enucleation of the cadaveric eye. As such, corneal retrieval can only be performed from cadavers hence regulations applicable to live organ donors were unwarranted. The amendment has also redefined the requirement of infrastructure, equipment, and human resources for retrieval, storage, and transplantation, thus making mandatory registration under the act simple.<sup>10</sup>

Despite positive trends in the field of eye banking and corneal transplantation, there are significant hurdles still prevailing and need to be addressed on a very positive and decisive note by the government to ensure certain changes in the policies to facilitate the process of cornea donation. Mandatory notification of any death in the hospital to the nearest eye bank for eye donation counseling and access to trauma centers/mortuaries and mandatory HCRP at large or medium mortality hospitals will also boost tissue collection. The amendment of the request law to extend “accepted medical standards” in articulating policies for the identification of “potential” organ donors will enhance the scope of tissue collections. The government may also consider providing legal status to the first-person consent and telephonic consent for the same purpose.<sup>11</sup>

Cost coverage of cornea donation is a major concern for any eye bank to be self-sustained being a nonprofit institution. The donations received, and the grant from the government is highly inadequate and insufficient to run the eye bank. Hence, there is a need to legalize the cost coverage, including the cornea processing fee.

The country needs to have an equitable distribution system equipped with a freely accessible and transparent interactive online portal governed by a unique identification number for every patient in a well-established national corneal transplantation registry system linked with better data tracking and patient discovery programs.

India has the biggest challenge of achieving 100,000 corneal transplants annually to clear the burden of corneal blindness, including a backlog considering less than 30,000 corneal transplants and 47,000 tissue collections. A herculean task is ahead to collect at least 200,000 corneas annually as well as increasing the tissue utilization rate by improving the quality of harvesting time by early retrieval of the tissue.<sup>12</sup>

The use of intermediate-period cornea preservative media such as optisol and cornisol over short-term preservative media such as McCarey-Kaufman (MK) medium will also improve the quality of tissue and surgical outcome. However, the increased cost burden has to be subsidized.

Hence, all-out efforts are the call of the hour to combat corneal blindness.

## REFERENCES

1. Mathews P, Benbow A, Corcoran K, DeMatteo J, Philippy B, Van Meter W. 2022 Eye Banking Statistical Report—Executive Summary. *Eye Banking and Corneal Transplantation* 2023;2:p e0008.
2. Tan H, Lin M, Gou Q, Li A, Gu F, Liu Q, *et al.* Trends in Corneal Transplantation and Characteristics of Donors in the Chongqing Eye Bank, China: A Retrospective Study, 1999-2018. *Front Med (Lausanne)*. 2021 Oct 28;8:750898.
3. Vashist P, Senjam SS, Gupta V, Gupta N, Shamanna BR, Wadhvani M, *et al.* Blindness and visual impairment and their causes in India: Results of a nationally representative survey. *PLoS One* 2022;17:e0271736.
4. Kate A, Basu S. Corneal blindness in the developing world: The role of prevention strategies. *F1000Res* 2024;12:1309.
5. Ang M, Moriyama A, Colby K, Sutton G, Liang L, Sharma N, *et al.* Corneal transplantation in the aftermath of the COVID-19 pandemic: An international perspective. *Br J Ophthalmol* 2020;104:1477-81.
6. Aiello F, Gallo Afflitto G, Pocobelli G, Ponzin D, Nucci C. Effect of Covid-19 on Eye Banks and Corneal Transplantations: Current Perspectives. *Clin Ophthalmol* 2022;16:4345-54.
7. Arya SK, Raj A, Deswal J, Kohli P, Rai R. Donor demographics and factors affecting corneal utilisation in Eye Bank of North India. *Int Ophthalmol* 2021;41:1773-81.
8. Moshirfar M, Odayar VS, McCabe SE, Ronquillo YC. Corneal Donation: Current Guidelines and Future Direction. *Clin Ophthalmol* 2021;15:2963-73.
9. Christy JS, Bhadari AH, Mathews P, Srinivasan M, Vanathi M. Evolution of eye banking in India - A review. *Indian J Ophthalmol* 2023;71:3132-41.
10. Tandon R, Singh A, Gupta N, Vanathi M, Gupta V. Upgradation and modernization of eye banking services: Integrating tradition with innovative policies and current best practices. *Indian J Ophthalmol* 2017;65:109-15.
11. Anitha V, Tandon R, Shah SG, Radhakrishnan N, Singh S, Murugesan V, *et al.* Corneal blindness and eye banking: Current strategies and best practices. *Indian J Ophthalmol* 2023;71:3142-8.
12. Gupta N, Vashist P, Ganger A, Tandon R, Gupta SK. Eye donation and eye banking in India. *Natl Med J India* 2018;31:283-6.

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