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State-wise Cornea Collection and Transplantation under the National Programme for Control of Blindness and Visual Impairment (NPCBVI) in India: A Record-based Study

Tarun P Tejwani[1], Krisha Tarun Tejwani[2*], Kalpna T Tejwani[3]

[1]Department of Ophthalmology, SMIMER, Surat, Gujarat, India
[2]Department of Community Medicine, SMIMER, Surat, Gujarat, India
[3]Department of Ophthalmology, Gurunanak Hospital, Surat, Gujarat, India

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***Corresponding author**:
Dr. Krisha Tarun Tejwani
(Email: krishatejwani@yahoo.com)

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ABSTRACT

Background: Corneal blindness is one of the major preventable causes of visual impairment in India, with a persistent gap between the demand for and availability of donor corneas. The present study aimed to assess national trends and state-wise variations in cornea collection and corneal transplantation over a five-year period (2016-17 to 2020-21) under the National Programme for Control of Blindness and Visual Impairment (NPCBVI).

Methodology: Retrospective record analysis was done using data from NPCBVI from 2016-17 to 2020-21 for cornea collection and transplantation. Data from state/UT wise were collected and rates per 1,00,000 population were calculated on the basis of estimated population.

Results: While cornea collection was rising slowly till 2017-18 (71,709; 5.76/lakh) and subsequently fell sharply to 17,402 (1.29/lakh) in 2020-21, cornea transplantation also followed a similar trend, declining from 31,417 (2.52/lakh) to 11,859 (0.88/lakh) over the five years. Marked regional variation was observed, with some states like Chandigarh, Telangana, Puducherry, Mizoram, and Gujarat showing higher collection and transplantation rates and other states namely, Bihar, Jharkhand, and North Eastern states lagged behind.

Conclusions: The country of India shows marked regional disparities concerning corneal procurement and transplantation. The number has fallen sharply since the time of the coronavirus pandemic.

Keywords: Corneal Transplantation, Eye Banking, NPCBVI, Cornea Collection, India

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INTRODUCTION

Corneal blindness remains a significant cause of preventable blindness worldwide and in India. It has been estimated that around 200,000 corneas from the donors are required annually to deal with the burden of corneal blindness in the country, however the current demands remain unmet due to an insufficiency in supply.[1,2] Despite national programs, India continues to face shortages of corneas owing to the lack of infrastructure facilities, awareness, and inconsistencies in eye banking in different states.[3] However, implementation remains uneven across regions.[4,5] Corneal harvesting in India has changed over the years from a voluntary system of donations to organised hospital-based cornea retrieval programs (HCRP) under NPCBVI.[6,2]

Eye banking operations were significantly affected during the COVID-19 pandemic, leading to reduced corneal procurement and transplantation.[7-10]. Under NPCBVI, the existing activities include the use of mobile ophthalmic units, IEC activities, and capacity building, and the limited state level analysis exist in literature.[11] Thus, state-wise evaluation of cornea collection and transplantation activities is essential for identifying regional disparities and trends to strengthen the eye care delivery systems in India.[12,13] While there is national-level information available, no comparative analysis at the state level has been conducted yet. Thus, the study was needed to assess the trends of corneal collection and transplantation in India from 2016-17 to 2020-21.

The purpose was to study national trends and state-by-state differences in cornea collection and transplantation under NPCBVI in India from 2016 to 2021.

MATERIALS AND METHODS

A retrospective, record-based descriptive study was conducted using secondary analysis of routinely collected data under the National Programme for Control of Blindness and Visual Impairment (NPCBVI). The study analysed state- and Union Territory-wise available data on cornea collection and corneal transplantation of five years from 2016-17 to 2020-21. The required data were obtained from officially published programme reports and administrative datasets available through government sources related to NPCBVI. These datasets provided year-wise information on the number of corneas collected and the number of corneal transplantations performed across different states and Union Territories in India.[14].Population estimates corresponding to each reporting year were obtained from official population datasets to facilitate calculation of standardised rates per 1,00,000 population.[15].For analysis, the primary variables included State/Union Territory, reporting year, total number of corneas collected, total number of corneal transplantations performed, cornea collection rate per 1,00,000 population, and corneal transplantation rate per 1,00,000 population. “Utilization rate was calculated as the percentage of collected corneas utilised for transplantation.” The cornea collection rate and corneal transplantation rate were calculated in Microsoft excel. Data were compiled and analysed using Microsoft Excel, and descriptive statistics were generated. Year-wise comparisons were undertaken to assess trends over time, and findings were presented using tabular and graphical representations. In addition, inter-state and regional variations were assessed by comparing rates across different states and Union Territories.

The analysed data were presented using tabular summaries and necessary graphs to help in proper interpretation of trends and patterns. The analysis included a total of 37 regions of India, that includes 22 major states, 8 northeastern states, and 7 Union Territories.

This study was exempted from the ethical approval as it involved only secondary analysis of data available in the public domain and did not involve any individual-level patient information.

RESULTS

National Level Trends: There was an overall increase in cornea donation till 2017-18, followed by a continuous decrease, with a sharp decline noted in 2020-21. Similar trends were noted for corneal transplant procedures. The collection rate reduced from 5.50/lakh (2017-18) to 1.29/lakh (2020-21), while the transplantation rate fell from 2.40/lakh to 0.88/lakh during the same period. Though the absolute number reduced, the utilisation of tissues improved from around 45% in 2016-17 to 68% in 2020-21 (reflecting efficient use of the limited supply of tissues). (Table 1).

Table 1: National Trends in Cornea Collection, Transplantation, and Utilisation Rates, under NPCBVI, India 2016-17 to 2020-21

Year	Cornea Collection	Collection Rate (/lakh population)	Corneal Transplantation	Transplant Rate (/lakh population)	Utilization Rate (%)
2016-17	67709	5.25	30740	2.38	45.4
2017-18	71709	5.5	31417	2.4	43.8
2018-19	68409	5.18	26601	2.02	38.9
2019-20	65417	4.9	31019	2.33	47.4
2020-21	17402	1.29	11859	0.88	68.1

Regional Differences: There was significant variation between states in all the years considered. Some regions that performed well in corneal donation/transplantation included Chandigarh, Telangana, Puducherry, Mizoram, and Gujarat. On the other hand, some poorly performing states include Bihar, Jharkhand, Himachal Pradesh, Chhattisgarh, as well as states in North-East India (Table 2; Figs 1-4). Union territories (UTs) located in urban areas, as well as Southern states, generally performed better compared to those from northern parts of India, as well as the North-East.

Main Findings: A sharp decline in donations and transplants was observed in 2020-21.

Table 2: Top and Bottom performing States/UTs based on Cornea Collection and Transplantation Rates (/lakh population) under NPCBVI, India 2020-21

Category	State/UT	Collection Rate (/1,00,000)	Transplant Rate (/1,00,000)
Top	Chandigarh	14.25	13.5
Top	Mizoram	8.47	2.16
Top	Puducherry	7.16	1.37
Top	Telangana	5.58	4.15
Top	Gujarat	3.68	0.93
Bottom	Bihar	0.06	0.06
Bottom	Jharkhand	0.02	0
Bottom	Himachal Pradesh	0.01	0.03
Bottom	Chhattisgarh	0.01	0
Bottom	Nagaland	0	0

DISCUSSION

This study demonstrates the temporal and spatial differences in cornea acquisition and transplantations under NPCBVI in India between 2016-17 and 2020-21.[14,15]

A modest improvement was observed prior to the COVID-19 pandemic; there has been a steep fall in 2020-21, corroborating the worldwide disruption in eye banking facilities amid COVID-19 [7-10,16]. The increase in utilization rates despite a fall in donations suggests more effective use of available tissue during shortages.[16] In contrast to the global standards, India still lags behind developed nations like the United States in eye banking performance.[17,18]

Significant advancements in corneal transplantation techniques, particularly lamellar keratoplasty, have improved outcomes globally leading to better survival and fewer rejections rates.[19,20] Consistent regional variations have been observed. High performance in Southern States and Union Territories like Chandigarh and Puducherry could be due to good eye bank infrastructure, early implementation of HCRP, high literacy rates, and awareness about eye donation. [2,6] However, low performance in Bihar, Jharkhand, and North-Eastern states could be due to structural constraints like poor infrastructure, geographical constraints, and low awareness rates. [3,12] The important gaps in the programs could be low HCRP coverage, imbalanced eye bank infrastructure, low awareness, and cultural issues. [2,13] Important policy actions could be compulsory reporting from hospitals, improvement in eye bank infrastructure in poor-performing states, integration with National Digital Health Infrastructure, and establishment of a central registry for cornea. [11] Further research is necessary to assess the long-term effects of these policies on the equitable delivery of corneal transplant services. [3,10]

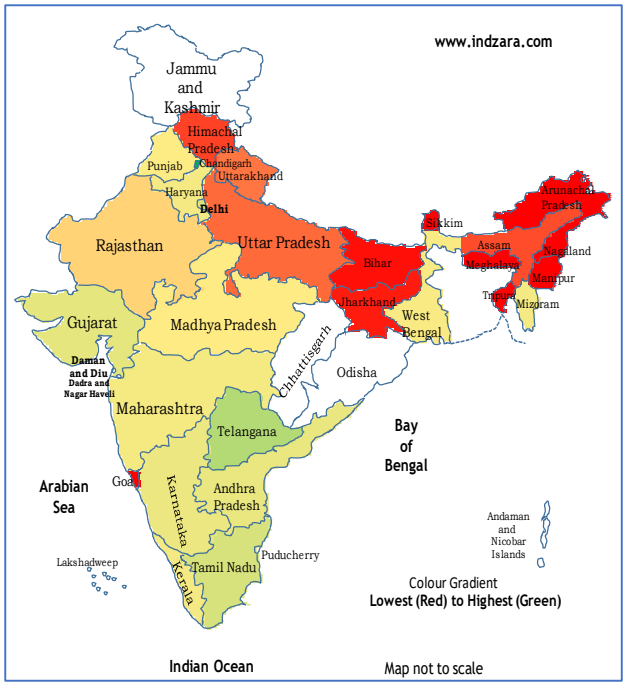

Figure 1: State/UT-wise Cornea Collection Rate (/lakh population) under NPCBVI in India 2019-20

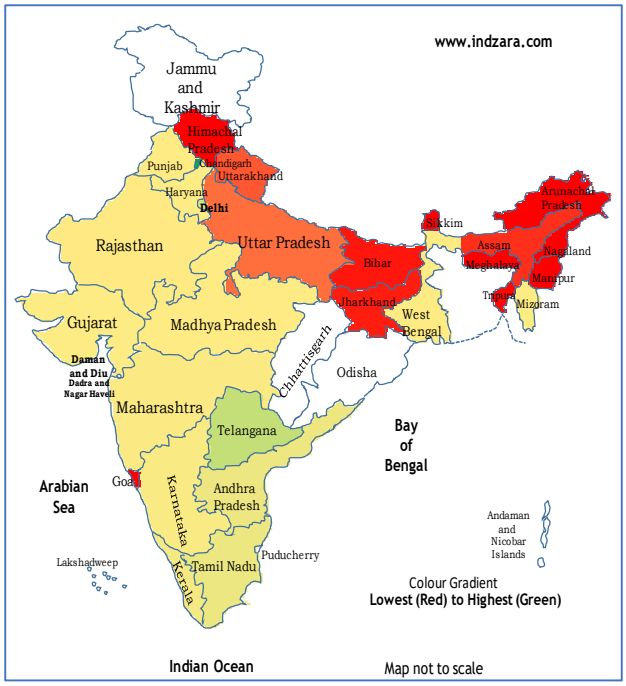

Figure 2: State/UT-wise Corneal Transplantation Rate (/lakh population) under NPCBVI in India, 2019-20

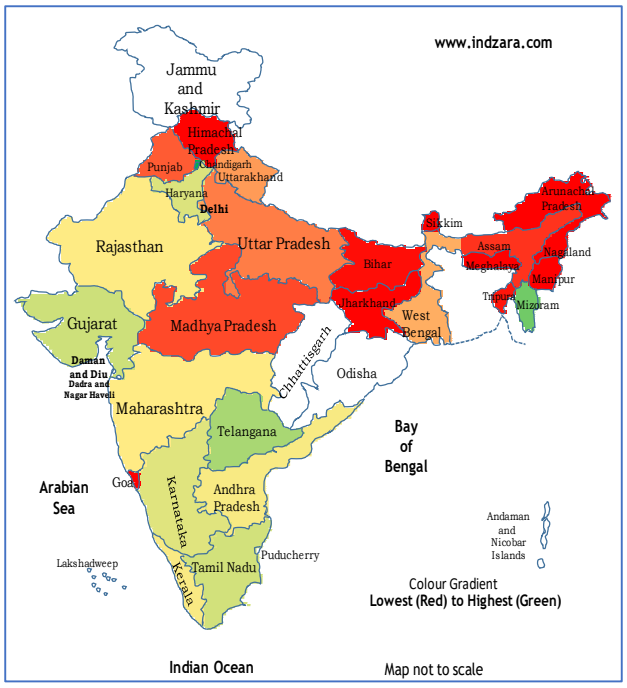

Figure 3: State/UT-wise Cornea Collection Rate (/lakh population) under NPCBVI in India, 2020-21

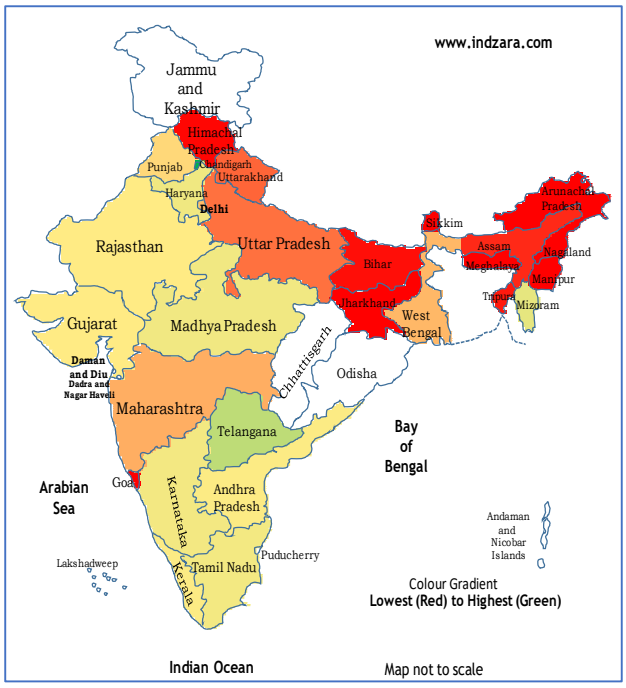

Figure 4: State/UT-wise Corneal Transplantation Rate (/lakh population) under NPCBVI in India, 2020-21

STRENGTH AND LIMITATIONS

This research employs national-level secondary data for a high degree of generalizability throughout India. But the trends beyond 2020-21 have not been considered. There are several limitations to this research that need to be discussed. First, no data was available regarding the number of eye banks, awareness, socio-economic variables, and voluntary/hospital-based eye donations. Additionally, the study may underestimate total corneal collection as data from private and non-NPCBVI eye banks were not included.

CONCLUSION

The findings in the study emphasize the existing regional inequalities and a sharp drop in corneal donations and transplants in India in 2020-21, which is mainly due to the COVID-19 pandemic. Despite some prior success, India continues to experience a substantial mismatch between the demand and supply of donor corneas. Closing this mismatch will entail improvements in eye bank infrastructures, hospital-based cornea donations, initiatives aimed at poorly performing regions, as well as adoption of online methods of donor registration and monitoring. Equitable distribution of corneal transplantation services is essential to reduce avoidable corneal blindness in India. Addressing these disparities is essential for achieving India's goal of eliminating avoidable blindness under Vision 2030.

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Availability of data: The data that support the findings of this study are available open access.

Declaration of non-use of generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

REFERENCES

1. Basak SK. Data gap: Transplantable corneal blindness, current transplantation, and eye banking in India. Indian J Ophthalmol. 2023 Sep;71(9):3125-3127. DOI: https://doi.org/10.4103/IJO.IJO_2096_23 PMid:37602596 PMCid:PMC10565946
2. Chaurasia S, Dureja R, Roy A, Das S. The expanding roles of eye banks in India: Past, present, and future. Indian J Ophthalmol. 2024 Jul 1;72(Suppl 4):S542-S552. DOI: https://doi.org/10.4103/IJO.IJO_2137_23 PMid:38454864 PMCid:PMC11338426
3. Gupta N, Tandon R, Gupta SK, Sreenivas V, Vashist P. Burden of corneal blindness in India. Indian J Community Med. 2013 Oct;38(4):198-206. DOI: https://doi.org/10.4103/0970-0218.120153 PMid:24302819 PMCid:PMC3831688

4. Sharma N, Arora T, Singhal D, Maharana PK, Garg P, Nagpal R, et al. Procurement, storage and utilization trends of eye banks in India. Indian J Ophthalmol. 2019 Jul;67(7):1056-1059. DOI: https://doi.org/10.4103/ijo.IJO_1551_18 PMid:31238409 PMCid:PMC6611250

5. 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 May;41(5):1773-1781. DOI: https://doi.org/10.1007/s10792-021-01736-x PMid:33893934 PMCid:PMC8087588

6. Christy JS, Bhadari AH, Mathews P, Srinivasan M, Vanathi M. Evolution of eye banking in India - A review. Indian J Ophthalmol. 2023 Sep;71(9):3132-3141. DOI: https://doi.org/10.4103/IJO.IJO_1882_23 PMid:37602599 PMCid:PMC10565934

7. Madkaiker A, Venugopal A, Ghorpade A, Ravindran M, Ragappa R, Sithiq MU. Eye banking and keratoplasty trend analysis during the COVID-19 pandemic: A South Indian observational study. Indian J Ophthalmol. 2023 Feb;71(2):498-502. DOI: https://doi.org/10.4103/ijo.IJO_1368_22 PMid:36727346 PMCid:PMC10228964

8. Nathawat R, Sharma N, Sachdev MS, Sinha R, Mukherjee G. Immediate impact of COVID-19 on eye banking in India. Indian J Ophthalmol. 2021 Dec;69(12):3653-3657. DOI: https://doi.org/10.4103/ijo.IJO_1171_21 PMid:34827016 PMCid:PMC8837375

9. 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 Dec 30;16:4345-4354. DOI: https://doi.org/10.2147/OPTH.S379849 PMid:36606249 PMCid:PMC9809163

10. Das AV, Kommu DR, Chilukuri R, Chilukuri H, Chaurasia S. Impact of the COVID-19 pandemic on the trends in corneal donor mortality data from Eye Bank records in India. Indian J Ophthalmol. 2022 Sep;70(9):3289-3293. DOI: https://doi.org/10.4103/ijo.IJO_778_22 PMid:36018105 PMCid:PMC9675537

11. Ministry of Health and Family Welfare, Government of India. National Programme for Control of Blindness and Visual Impairment (NPCBVI) [Internet]. New Delhi: Ministry of Health and Family Welfare; [cited 2026 March 10]. Available from: https://npcbvi.mohfw.gov.in/

12. Vashist P, Senjam SS, Gupta V, Gupta N, Shamanna BR, Wadhwani M, et al. Blindness and visual impairment and their causes in India: Results of a nationally representative survey. PLoS One. 2022 Jul 21;17(7):e0271736. DOI: https://doi.org/10.1371/journal.pone.0271736 PMID: 35862402 PMCID: PMC9302795

13. Parihar JKS. Corneal blindness and eye banking: Current status and challenges ahead. Ann Natl Acad Med Sci (India) 2024;60(4):241-243. DOI: https://doi.org/10.25259/ANAMS_226_2024

14. Ministry of Health and Family Welfare, Government of India. State/UT-wise Cornea Collection and Corneal Transplantation under National Programme for Control of Blindness & Visual Impairment from 2016–2017 to 2020–21 [Internet]. New Delhi: Open Government Data (OGD) Platform India; 2022 Mar 30 [cited 2026 March 11]. Available from: https://www.data.gov.in/resource/stateut-wise-cornea-collection-and-corneal-transplantation-under-national-programme

15. Ministry of Health and Family Welfare (IN), Department of Health and Family Welfare. Measures to Check Population Growth. Lok Sabha Unstarred Question No. 2996 [Internet]. New Delhi: Government of India; 2021 Aug 6 [cited 2026 March 15]. p. 3, Annexure I. Available from: https://sansad.in/getFile/loksabhaquestions/annex/176/AU2996.pdf?source=pqals

16. Parekh M, Nathawat R, Parihar JKS, Jhanji V, Sharma N. Impact of COVID-19 restrictions on corneal tissue donation and utilization rate - Time to bring reforms? Indian J Ophthalmol. 2021 Dec;69(12):3782-3784. DOI: https://doi.org/10.4103/ijo.IJO_2714_21 PMid:34827052 PMCid:PMC8837285

17. Eye Bank Association of America. Statistical Report [Internet]. Chantilly (VA): Eye Bank Association of America; [cited 2026 Mar 11]. Available from: https://restoresight.org/members/publications/statistical-report/

18. Eye Bank Association of America. 2024 Eye Banking Statistical Report [Internet]. Washington (DC): Eye Bank Association of America; 2025 [cited 2026 Mar 11]. p. 6. Available from: https://restoresight.org/wp-content/uploads/2025/04/2024_StatisticalReport_FINAL.pdf

19. Tay C, Reddy H, Mehta JS. Advances in corneal transplantation. Eye (Lond). 2025 Sep;39(13):2497-2508. DOI: https://doi.org/10.1038/s41433-025-03898-9 PMid:40615612 PMCid:PMC12402337

20. Hashemian MN, Zia MJ, Khorrami-Nejad M, Abed QS, Hashemian H. Long-term outcomes of corneal transplantation: a review of 8,378 patients. BMC Ophthalmol. 2025 Jan 22;25(1):39. DOI: https://doi.org/10.1186/s12886-024-03826-7 PMid:39844058 PMCid:PMC11756154