

Editorial India's triumph over trachoma: Leveraging a consolidated multi-pronged approach

Anand Bhimaray Janagond¹*

¹Dept. of Microbiology, S. Nijalingappa Medical College, Bagalkot, Karnataka, India



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Neglected tropical diseases (NTDs) are a group of infectious diseases that primarily affect the poorest communities in tropical and subtropical areas, generally tend to be chronic disabling conditions, and rarely fatal.¹ WHO has identified 21 conditions as NTDs till December 2023, and 12 of them are prevalent in India. India, with its large population and diverse ecological zones, bears a significant burden of the global NTDs that include soil-transmitted helminthic infections (ascariasis, hookworm infection, and trichuriasis), lymphatic filariasis, visceral leishmaniasis, leprosy and rabies.² Trachoma has been formally removed from the list from October 2024 when the WHO has declared India as "free from Trachoma", officially endorsing that the trachoma is eliminated from India.³

Trachoma is caused by *Chlamydia trachomatis* (serotypes A, B and C) and has been a major cause of preventable blindness worldwide.⁴ The infection is known to spread from person to person through contaminated fingers, fomites and flies (the three Fs) that have come into contact with discharge from the eyes or nose of an infected person. Environmental risk factors that promote trachoma transmission include poor hygiene, over-crowded living

conditions, and inadequate access to water, and sanitation facilities. Repeated infections in childhood tend to lead to scarring of the inner side of the upper eyelids, which results in inward turning of the eyelid margin, with the eyelashes touching the eyeball (trachomatous trichiasis). This is a painful condition, if left untreated, can progress to visual impairment and blindness.^{2,5}

It is estimated that in 1960s around 50% of the population in some of the Indian states - Gujarat, Rajasthan, Punjab, Haryana, Uttar Pradesh, and the Nicobar Islands – were affected with trachoma. In 2016, India accounted for 53% of the global trachoma case burden leading to visual impairment.² In 2005, trachoma was responsible for 4% of all cases of blindness in India. By 2018, the prevalence of trachoma was down to 0.008%, finally reaching elimination status in 2024.² India's journey in elimination of trachoma is depicted in Figure 1.

Elimination of trachoma is a significant milestone in India's healthcare improvement journey. Several factors contributed to India's successful elimination of trachoma as a public health problem. These include:

1. Strong leadership and commitment: The Indian government demonstrated strong leadership and commitment to eliminating trachoma by allocating

* Corresponding author.



Figure 1: India's journey in eradication of trachoma (Source: Press Information Bureau, Govt. of India)²

resources and integrating trachoma control into national health programs. The National Blindness Control Programme (NPCB), now known as the National Programme for Control of Blindness & Visual Impairment (NPCBVI), played a crucial role. State health departments across India were responsible for implementing trachoma control activities at the district and community levels. They played a crucial role in mobilizing resources, training health workers, and monitoring progress.^{4,5}

The simplified WHO trachoma grading system was effectively used for identification and grading of trachoma cases in the national program. Active trachoma cases were identified based on clinical features - Irritation of eyes, mucoid or muco-purulent discharge, swelling of upper eyelids, follicles, papillae, etc. Chornic trachoma was again identified based on clinical features such as conjunctival scarring, Herbert's pits, trichiasis, entropion, etc. While microbiological tools like culture and nucleic acid amplification tests (NAATs) are available for detecting the presence of *Chlamydia trachomatis*, the bacteria that causes trachoma, they are not routinely used in the program due to their cost, complexity, and limited availability in rural areas.^{2,4,6}

2. Comprehensive strategy: India adopted the SAFE strategy (Surgery, Antibiotics, Facial cleanliness, and Environmental improvement) recommended by the World Health Organization (WHO) to prevent and treat trachoma. SAFE strategy included surgical correction of trichiasis, mass administration of antibiotic (mainly azithromycin), promoting facial cleanliness and personal hygiene, and Environmental improvement in the form of access to clean water and sanitation, to reduce the breeding of flies that can transmit the bacteria. Water and sanitation (WASH) activities were advocated through the national program, Govt health agencies, by Swachh Bharat

Abhiyan, Anganwadis, NGOs, etc.^{2,4}

- 3. Community engagement: Various communities in India were actively involved in trachoma control efforts through awareness campaigns, health education, and social mobilization. This helped to promote behavioral changes and improve hygiene practices, which are crucial for preventing trachoma transmission.⁴
- 4. Effective surveillance and monitoring: India established a robust surveillance system to monitor the prevalence of trachoma and track progress towards elimination. This allowed for timely identification of areas with high burden and targeted interventions.^{4,5}
- 5. Integration with other health programs: Trachoma control efforts were integrated with other health programs, such as maternal and child health, Swachh Bharat Mission, School Health Program, etc to maximize impact and efficiency.^{2,4}
- 6. Collaboration with partners: India collaborated with various partners, including WHO, UNICEF, NGOs, and international organizations, to strengthen its trachoma control program and leverage expertise and resources. The WHO provided technical guidance, financial support, and capacity building to India's National Programme for Control of Blindness & Visual Impairment (NPCBVI). Organisation like the Carter Center, Uniting to Fight Blindness (UFB), etc supported India's trachoma control efforts by providing technical expertise, training, financial support, and advocacy.^{2,4–6}

The following can be inferred based on the success of Trachoma elimination

- 1. Strong political commitment and leadership that prioritises healthcare needs, provides sustained financial support and ensures coordination among various stakeholders in implementation of selected strategies is essential.
- 2. Comprehensive and Integrated Approach that is multipronged at addressing at prevention, treatment and control levels is crucial.
- 3. Robust surveillance and monitoring systems that have simple and effective tools can bring sea change. This, in case of some infections, can be achieved even in the absence of specific and advanced microbiological diagnostic tools. It is pertinent to note that, for several other infectious diseases, confirmation of a case is the first crucial step in the program and is completely dependent on microbiological diagnostic tools.
- 4. Strong partnerships, collaborations and optimum community engagement can provide significant push achieving the healthcare goals.

These lessons can be taken forward and applied as a model to other infection control programs. Several such components can be seen in the national programs addressing tuberculosis, malaria, HIV/AIDS, etc. There is also a need to develop microbiological diagnostic tools that are reliable, cost-effective, rapid and point-of-care to assist such programs.

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Author's biography

Anand Bhimaray Janagond, Professor ⁽ⁱ⁾ https://orcid.org/0000-0003-1820-8558

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