

Indian Cataract Epidemiology Prevention and Treatment Plans

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ABSTRACT

In India, cataract-related blindness is a major social, economic, and medical burden as well as a major cause of human illness. According to a survey conducted by the WHO and NPCB (National Programme for Control of Blindness), India has a backlog of over 22 million blind eyes and 12 million blind persons, 80.1% of whom are blind as a result of cataract. 3.8 million people worldwide experience cataract-related blindness every year. There are currently between 1.6 million and 1.9 million cataract procedures performed annually. In comparison to the current rate of 1.7 million cataract procedures per year, 5–6 million cataract operations will need to be conducted annually in order to address the backlog of cataract cases by the year 2000 and the rising incidence. With financial support from the World Bank, India is starting a new, long-term project to increase the capabilities of cataract surgery and service levels. The focus on implementing the cataract blindness programme in rural and tribal communities is a key component of this project.

The emphasis on contemporary extracapsular cataract extraction with intraocular lens implantation as the preferred surgical approach is the second feature. Creating institutional capability and suitable coordination structures for collaboration between nongovernmental organisations and the public sector to provide coverage to the most disadvantaged communities is another notable aspect. The fourth and most crucial tactic is to launch aggressive campaigns against cataract blindness at the state and federal levels in order to significantly boost demand for cataract services. Given that cataract blindness affects populations significantly earlier in life due to a variety of social, economic, and environmental reasons, a country like India has greater significance for such a plan.

Keywords: Cataract W Prevalence W Epidemiology W Intra-ocular lens W Extracapsular cataract extraction W Risk factors.

1. INTRODUCTION

In India, cataract-related blindness is a major social, economic, and medical burden as well as a major cause of human morbidity [1, 2]. India currently finds itself in an unfortunate position in terms of the global blindness.

According to WHO estimations, the rate of blindness rose between 1975 and 1990. The problem is being approached from multiple angles. The main focus has been on doing more cataract procedures with greater rates of sight return. Additionally, efforts are made to use medical treatment to halt the development and advancement of cataract.

It has been determined that a number of reasons are behind the rise in blindness.

These include a longer life expectancy, insufficient surgical equipment, and rising desire for better vision. Inadequate case identification, decision-making, care delivery, and cataract surgical facilities are further issues. Thus, in order to increase effectiveness, it is important to carefully consider the acceptability, accessibility, and affordability of cataract surgical procedures. A considerable change in the state of affairs would not be conceivable based on existing levels of performance efficiency. To address the issue, new and more targeted approaches are needed.

Prevalence and Incidence of Cataract

The Indian Scene: Several cross-sectional studies conducted over the past ten years have provided information on the prevalence of cataract and cataract-related blindness in India. According to a survey done by the ICMR between 1971 and 1974, 1.38% of the general population was blind, with cataracts accounting for 55% of cases. According to the WHO-NPCB (National Programme for Control of Blindness) survey conducted between 1986 and 1989, India has a backlog of over 22 million blind eyes and 12 million blind people with visual acuities less than 6/60. The survey also found that 80.1% of these people are cataract-relatedly blind. These prevalence figures are helpful in understanding the cataract problem's backlog, but they do not provide the number of new cases that are diagnosed annually. An estimated 3.8 million people in India lose their vision due to cataracts each year, according to the first population-based longitudinal study, which was created to directly evaluate cataract incidence and risk factors linked with it [3]. Currently, there are between 1.6 million and 1.9 million cataract procedures performed annually. As a result, the backlog is growing significantly and there are no plans to reduce the current rate from 1.4 to 0.3, which was the aim for the year 2000. Our eye surgeons will need to execute 5–6 million cataract procedures each year to make a major dent in the backlog of cataract cases and address the rising incidence.

Factors Associated with Age-Related Cataracts

A multifactorial illness, cataract is. Age-related cataract's precise cause is not well understood. However, cataract has been linked to numerous sociodemographic, environmental, dietary, and medical variables [4].

Sociodemographic Factors: These variables include education, gender, and personal habits like drinking and smoking. According to studies, communities in rural areas and uneducated people have greater rates of cataract and accompanying blindness. An Indian survey revealed

that women had a higher risk of cataracts than men did. It has been established that heavy drinkers and smokers have a higher chance of acquiring cataracts.

Environmental Factors: Early research on ultraviolet radiation found that cataracts were more common in tropical regions, where sunshine exposure was higher than in temperate climates [6]. According to a study conducted in Nepal, populations living in locations with more than 12 hours of sunshine exposure have a 4 times higher frequency of cataracts than those living in places with less than 7 hours [7]. The majority of rural jobs in India currently entail working long hours outside in conditions where exposure to sunlight can be high. The higher prevalence of cataract in India may be at least partially attributable to this.

Medical Factors: Numerous pathophysiological diseases, including diabetes, diarrhoea, a lack of antioxidant intake, and medications, have been linked to the aetiology of cataract. A well-known cataract risk factor is diabetes. Repeated diarrheal episodes are a significant factor in the development of cataract, according to a few epidemiological studies from central India [8]. The consumption of antioxidant vitamins A, C, and E is one nutritional element that has attracted the most attention in the past ten years. However, no epidemiological research on this topic has been done in India.

Cataract Blindness

Social Implications: Up until recently, the social and managerial components of cataract surgery were largely disregarded, which led to a less than ideal use of the available resources. In rural India, the typical cataract-blind person is illiterate, comes from a lower socioeconomic class, has no independent source of income, and is typically restricted to the four walls of their home. These patients frequently lead lonely lives as widows.

Most rural cataract blind people who finally seek treatment are beyond 70 years old, according to studies done at the R.P. Centre in New Delhi [9]. Although more than a third of these individuals had cataracts, surgery hadn't been performed on them in more than two years [10]. Eighty-three percent of patients (88.3%) were unaware that a primary health centre (PHC) could also be of assistance. Financial limitations, the distance to an eye care facility, a patient's lack of awareness of the severity of their eye condition, the inability of other family members to accompany them to the eye care facility, and ignorance were among the most common excuses given for not using eye care facilities.

Combating Cataract

In order to fight the backlog of cataract cases and the rising rate of blindness on a war footing, the Government of India founded the NPCB in 1976 as a programme that was entirely funded by the federal government.

Establishing regional ophthalmology institutes, modernising medical schools and district hospitals, creating mobile eye units, hiring ophthalmologists, and offering a range of ocular services are only a few of the tasks included in this initiative. The Danish International Development Agency has also been providing financial support to the NPCB. A initiative to reduce cataract-related blindness with support from the World Bank has been launched to expand the program's activities in seven of the nation's largest states. Over the course of the initiative, which runs from 1994 to 2001, 1.1 crore cataract surgeries are expected to be

performed. The joint venture will not only address the issue of resource scarcity, but it will also enhance technology in the field of eye care services [11].

Plans and Strategies

The programme aims to improve the infrastructure and surgical facilities in order to provide high-quality and frequent cataract surgery. The states of Maharashtra, Uttar Pradesh, Madhya Pradesh, Orissa, Rajasthan, Andhra Pradesh, and Tamilnadu were chosen to be covered by the initiative based on the high prevalence levels. The majority of Americans who are blind live in these seven states. They make up about two-thirds of the blind people in the nation and one-fourth of all the people worldwide.

The project's main goals are to:

- (1) Increase the effectiveness of cataract surgery and decrease the prevalence of cataract blindness in the aforementioned states;
- (2) Strengthen India's ability to deliver high-volume, high-quality, and affordable eye care; and
- (3) broaden the reach of eye care delivery to underserved population groups such as women, those in tribal areas, and those living in remote and inaccessible locations.

High-standard care, technological advancement, coordinated efforts, demand generation, team approach, development of new technical standards in regard to diagnostic guidelines and screening techniques, quality visual outcome, and establishment of grievance committees in each District Blindness Control Society are just a few of the project's revised strategies (DBCS).

Financial Outlay: The project will cost a total of Rs 554.36 crores, which is equal to US\$ 135.5 million. The International Development Agency has contributed US\$ 117.8 million (89.9%), and the Government of India has contributed 10.2%. State-by-state budgets are assigned for the duration of the project. The remainder of the project budget would go toward core expenses like training, publicity services, one-time contributions to NGOs, etc.

Technological Advancement: By receiving training in cutting-edge diagnostic methods, high-volume cataract surgery, and extracapsular cataract extraction (ECCE) with intraocular lens (IOL) implantation, emphasis will be placed on improving the abilities of ophthalmic personnel. All service delivery methods will be subject to newly created and adopted technological standards. The following are some of these technical rules' key characteristics:

- (i) Setting operational requirements for running eye camps;
- (ii) Establishing minimally acceptable surgical standards, including the number of sutures needed;
- (iii) Treating unilateral cases only if ECCE with IOL can be performed;
- (iv) Confining ECCE/IOL surgeries to established facilities.

Promoting Outreach Activities and Public Awareness: To increase coverage of the most vulnerable groups, coordinated efforts will be undertaken to strengthen institutional capacity and the necessary coordination structures for cooperation across the public, private, and non-government sectors: At the state and federal levels, aggressive campaigns are required. The effectiveness of the programme would not only be determined by the quantity of procedures completed but also primarily by the visual consequences. The needs of the patient will be prioritised above all else.

Strengthening Service Delivery: In order to provide high-quality surgery at every location, efforts will be made to enhance the physical, technical, and managerial capacities of medical colleges, district hospitals, community health centres (CHCs), and chosen non-profit institutions. The Central government, State governments, and NGOs work together to carry out the initiative. By upholding its standards, boosting the output of resources supplied, regularising camp organisation, involving NGOs and the commercial sector, and expanding coverage to tribal and distant rural areas, service delivery can be strengthened.

Guidelines to Organize Eye Camps: To enhance and uphold minimal standards in service delivery, new rules have been created on the advice of the "Consensus Workshop on Norms and Standards." Major recommendations include the following:

- i. The minimum duration of the eye camps should be 7 days, of which 5 days would be post operative; I the camp should be held at a CHC/PHC;
- ii. For a high-quality result, continuous monitoring, supervision, and assessment should be ensured;
- iii. 4-6 weeks should pass before scheduling a follow-up;
- iv. To hold eye camps, both rural communities and urban slums need get aid;
- v. No more than 50 surgeries may be performed by a surgeon per day; Before surgery, a local antibiotic should be administered; Five corneosceral sutures at the very least are advised.

Guidelines for Involvement of NGOs: Only groups that were incorporated in accordance with the Societies Registration Act, nonprofit institutions, public trusts, and statutory trusts are permitted to take part. Their past performance, experience, staff availability, managerial skill, and prior involvement in the community will all be considered in the selection process. NGOs have also been divided into categories A, B, and C based on their usage of government resources, such as vehicles and rough terrain. Additionally, new plans for one-time grants to NGOs for their growth into rural regions as well as plans for the participation of private surgeons in area-specific contacts are being developed. Additionally, loan facilities are being developed for ophthalmologists eager to set up surgical units in rural locations.

Guidelines for Type of Cataract Surgery and Monitoring Performance: The possibility for sight restoration, the patient's state, and the overall viability of surgery will all be taken into consideration when choosing the type of cataract surgery to be performed on a patient. Some recommendations for choices have been formulated.

Achievement: Regional eye care institutes and a centre of excellence in the field have been created at the All India Institute of Medical Sciences in New Delhi. Under the NPCB, district hospitals now offer ophthalmology care. Five pilot districts have successfully adopted the DBCS idea to decentralise the management of ophthalmic services and create a cooperation between the public, corporate, and non-profit sectors. To increase accessibility of ophthalmic services, district mobile units and central mobile units have been established. PHCs, the primary facilities in rural regions, are outfitted with optical equipment and have paramedical ophthalmic support posted. More than 372 districts have been covered, including more than 200 in the World Bank-supported project's participating states. There are currently 200

district programme managers in place. Funds have been provided to more than 300 DBCSs to start the operations. The initiative has produced useful results thus far, but much more work needs to be done to ensure the effectiveness of the new strategies. By the turn of the century, it is believed that the creation of DBCSs will achieve the goals set forth and lower the prevalence of cataract-related blindness in India.

Risk Factors and Medical Therapy of Cataract: Despite improved surgical capabilities over time, a significant percentage of people continue to experience cataract-related handicap. The causes include everything from psychological restraint to having surgery to the general avoidance propensity of using medical treatment. Due to the shortcomings of cataract surgery, experimental cataract research in lab animals has been sparked in an effort to create pharmacological methods of reducing the development of cataracts. In India, significant research in this area is now being conducted. The identification of the aetiological elements involved in cataract aetiology is necessary for such an approach to be successful. Senile cataract's pathogenesis has been linked to a number of risk factors.

In addition to ageing, genetics, nutrition, diarrhoea, diabetes, UV radiation, and smoking have all been linked to cataract risk. In various experimental models, a wide variety of drugs with various chemical compositions and properties have been found to have a protective effect against cataract [12–15].

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