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Prevalence, Causes, and Outcomes of Visual Impairment among Adults Aged ≥50 Years in Alipurduar District, West Bengal: A Population-Based RAAB Study

Ananta Basudev Sahu

asahu@sightsaversindia.org

Sightsavers India

Sandeep Buttan

Sightsavers

Kamal Kumari Chakraborty

Sightsavers

Sampa Paul

Sightsavers

RN Mohanty

Sightsavers

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Abstract

Background

Blindness and visual impairment remain significant public health challenges in rural India, particularly in underserved regions such as Alipurduar district, West Bengal, where difficult terrain, limited healthcare infrastructure, and low awareness restrict access to eye care services. This study evaluated the prevalence and causes of blindness and visual impairment among individuals aged ≥ 50 years, assessed cataract surgical coverage (CSC) and outcomes, and identified barriers to eye care following implementation of the High Impact Rural Eye Health Programme by Sightsavers India.

Methodology

A population-based cross-sectional survey was conducted using the WHO-recommended Rapid Assessment of Avoidable Blindness (RAAB) methodology. A total of 3,000 participants aged ≥ 50 years were examined across 60 randomly selected clusters. Visual acuity assessment and ophthalmic examinations were performed using standardized protocols, while structured questionnaires captured demographic characteristics and barriers to service uptake. Data were analyzed using STATA software.

Results

The prevalence of blindness was 0.1%, exceeding the programme target of 0.3%. Severe visual impairment was observed in 0.76%, moderate visual impairment in 5.99%, and early visual impairment in 5.89% of participants. Cataract was the leading cause of blindness (66.7%), while uncorrected refractive errors accounted for most early visual impairment (74.5%). CSC reached 100% for severe and 98.7% for moderate visual impairment. Good postoperative visual outcome (≥ 6/12) was achieved in 81.2% of operated eyes. Fear and lack of perceived need were the major barriers to service uptake.

Conclusion

The programme substantially reduced avoidable blindness and improved equitable access to quality eye care services in a rural setting.

1. Introduction

The World Health Organization (WHO) estimates that globally around 2.2 billion people live with some form of visual impairment (near or distance), of which approximately 1 billion have vision impairment that remains unaddressed [1]. Approximately 80% of all visual impairment is considered avoidable, with the primary causes being uncorrected refractive errors and cataract, which, if not diagnosed and treated in time, can lead to blindness. United Nations Sustainable Development Goal 3 emphasizes health and well-being as a central priority, aiming to prevent suffering from avoidable diseases and improve population health outcomes. Eye health is an integral component of overall health and well-being. Notably, most people with visual impairment reside in low- and middle-income countries (LMICs) and are aged over 50 years [2].

In India, more than one-fourth of individuals aged 50 years and above are visually impaired, with a blindness prevalence of 1.99%, which is a matter of concern. The proportion of blindness and visual impairment attributable to avoidable causes is estimated at 92.9% and 97.4%, respectively [3]. Evidence from Bangladesh suggests that the majority of blindness among people aged 50 years and above is avoidable, with cataract being the leading cause [4].

Cataract and uncorrected refractive errors constitute the major causes of avoidable blindness, which can be effectively addressed through available, affordable, and accessible eye care services. There is a strong correlation between cataract prevalence and blindness among the elderly population. However, socioeconomic inequalities significantly influence access to eye care services. Studies conducted across rural and urban settings indicate disparities in access: while the urban poor may access cataract services, rural populations often face greater barriers, suggesting deeper poverty-related constraints in rural areas. Furthermore, unequal coverage of cataract services among women has been observed across both rural and urban settings.

The Rapid Assessment of Avoidable Blindness (RAAB) methodology is widely used to assess blindness and visual impairment. However, studies augmenting RAAB tools have highlighted that disability status and relative wealth are important dimensions that influence findings but are not always adequately captured. These studies demonstrate that cataract service coverage varies by sex, disability, and socioeconomic status [5]. While Cataract Surgical Coverage (CSC) is a key indicator for assessing access to eye care, the quality of services is equally important. This is captured by Effective Cataract Surgical Coverage (eCSC), which integrates both access and quality of outcomes. Effective CSC is cluster-adjusted, age-adjusted, and sex-adjusted, providing a more comprehensive understanding of cataract service delivery across populations [6].

In 2021, Sightsavers India conducted a baseline study using the WHO-recommended Rapid Assessment of Avoidable Blindness (RAAB) methodology, surveying 3,000 individuals aged 50 years and above in Alipurduar district, West Bengal. The study reported a blindness prevalence of 1.5% among this age group [7], indicating a substantial burden of avoidable visual impairment. As most blindness is preventable or treatable—primarily through timely cataract surgery and appropriate refractive services—the findings highlighted critical gaps in service coverage and uptake.

In response, Sightsavers India implemented a rural eye health programme in the district, supported by Azim Premji Philanthropic Initiatives, to strengthen comprehensive eye care services. The programme aims to eliminate avoidable blindness by reducing its prevalence to 0.3% or lower.

Therefore, the present study was essential to generate reliable baseline evidence on the prevalence and causes of blindness and visual impairment among individuals aged 50 years and above. In addition, it aimed to assess the coverage and quality of cataract surgical services and to identify key barriers limiting service uptake. The insights generated are intended to guide programme strategies, inform targeted interventions, and support policy-level decisions to improve access, equity, and quality of eye care services in the region.

In line with these broader goals, the primary objective of the study was to assess the prevalence, causes, and outcomes of blindness and visual impairment among individuals aged 50 years and above, and to evaluate the coverage and quality of cataract surgical services while identifying barriers to their uptake. Specifically, the study sought to estimate the prevalence of blindness and visual impairment, identify their major causes, assess cataract surgical coverage and visual outcomes following surgery, and examine the barriers influencing the uptake of cataract surgical services.

2. Methodology

2.1 Description of the study area

Alipurduar is one of the districts in the Eastern side of India, in the state of West Bengal. Alipurduar was formerly part of the district, Jalpaiguri and it was created into a separate district in 2014. The district consists of one Municipality (urban) and six community development blocks (rural) i.e. Madhirat-Birpa ra, Alipurduar-I, Alipurduar-II, Falakata, Kalchini and Kumargram. The district has an area of 3136 sq.km, with 327 villages and a sex ratio of 948/1000.As per 2011 census, the total population size was 15,01,983 and a literacy of about 64.7% (Census, 2011) [8]. Eighty percent of the population belong to marginalised populations like scheduled caste and scheduled tribe community [9].

2.2 Study Population

The study population consisted of individuals aged 50 years and above who had been residing in the Alipurduar district of West Bengal for at least six months prior to the survey.

2.3 Study design and period

We conducted a cross-sectional population-based survey in Alipurduar district, West Bengal, India, to estimate the prevalence of blindness and visual impairment due to uncorrected refractive error (URE) among individuals aged 50 + as per ICD-11 guidelines. Using non-invasive methods, we assessed visual acuity (distance and near vision) and identified eye conditions like cataracts. A pre-tested questionnaire collected data on eyeglass use and barriers to accessing refractive error services.

2.4 Eligibility criteria

The inclusion criteria for the survey comprised individuals aged 50 years and above, who provided consent and were willing to participate, and had been ordinarily resident in the area for at least six months prior to the survey. Exclusion criteria included individuals below 50 years of age, visitors or outsiders, and those who refused to provide consent.

2.5 Sample size determination

To estimate the sample size for the endline study of the Rapid Assessment of Avoidable Blindness (RAAB) among the population aged 50 years and above in the Alipurduar district, we followed the standard approach considering the following parameters:

- **Population (N)**: 1,681,813

- **Expected prevalence (P)**: Between 1.37% (0.0137) and 0.03% (0.0003). We used the average of these values.
- **Confidence interval**: 95% (Z = 1.96)
- **Non-response rate**: 10% (0.1)
- **Design effect (DE)**: 1.5

A minimum sample size of 3,000 persons aged 50 years and above was used for this study. These individuals were selected from 60 clusters of 50 persons each, resulting in a total sample size of 3,000.

2.6 Sampling technique

A two-stage sampling method was employed. First, 60 villages were randomly selected using probability proportionate to size, based on Census 2011 data verified with district authorities. Within each village, 50 eligible participants (aged 50+) were enrolled. Cluster informers worked with village leaders to define village/segment boundaries, using maps for larger villages (exceeding 500 or more inhabitants). On survey days, teams started at the house nearest to the main road, enumerating all eligible residents and conducting visual acuity screenings. Absentees were revisited, and basic data were collected from family or neighbors if necessary, continuing until 50 participants were enrolled. A total of 3,000 participants were enrolled across 60 clusters. Among them, 20 individuals refused participation, 14 were not available despite repeated visits, and 14 were unable to participate. Therefore, 2,952 individuals (98.4%) were successfully examined, which constituted the final analytical sample (Fig. 1).

2.7 Data collection methods

2.7.1 Survey procedures

The survey, conducted in November 2024, included 3,000 participants aged 50 + who were permanent residents for at least 6 months and consented to participate. Temporary visitors, those under 50, or unwilling individuals were excluded. Two attempts were made to reach participants; unavailable individuals were marked as such without substitution. Surveys used a pre-tested questionnaire, with quality checks and informed consent documented via the CommCare app. Data was collected in person, lasting ~ 45 minutes, and monitored through supervision, back-checks, and debriefs. The survey team, including optometrists and community health workers, underwent a 4-day training on non-invasive eye tests (e.g., visual acuity, torchlight examination) and inter-observer variance (IOV) testing to ensure data quality. A pilot was conducted to validate tools and refine workflows, focusing on visual acuity measurement and identifying causes of visual impairment.

2.7.2 Eye Examination protocol

A standardized, pre-tested protocol was used to assess eye health. This included measuring unaided and aided visual acuity (VA) using a Snellen chart with tumbling “E” optotypes at 6 meters. Participants with VA < 6/12 in either eye were re-assessed with a multiple pinhole. Anterior segment examination was done using a torchlight, and lens status was evaluated with torchlight and distant direct ophthalmoscopy (DDO)

in a shaded environment without pupillary dilatation. Demographic data, including spectacle use, were collected via a questionnaire. Participants with visual impairment or significant lens opacity were asked about barriers to cataract service uptake.

2.8 Data analysis

Data was stored on encrypted devices, synced daily, and analyzed using STATA 12. Descriptive statistics were used to summarize the characteristics of the study population, including age and sex distribution. The prevalence of blindness, severe visual impairment (SVI), moderate visual impairment (MVI), and early visual impairment (EVI) was calculated and presented as percentages along with 95% confidence intervals (CI).

The principal causes of visual impairment were identified and presented as proportions. Cataract Surgical Coverage (CSC) was calculated at different visual acuity thresholds (3/60, 6/60, 6/18, and 6/12) using standard RAAB methodology. Effective Cataract Surgical Coverage (eCSC) was also estimated to assess the proportion of individuals who received cataract surgery with a good visual outcome. Visual outcomes of cataract surgery were categorized as very good (VA ≥ 6/12), good (VA = 6/18), borderline (VA < 6/18 to 6/60), and poor (VA < 6/60). Barriers to cataract surgery were analyzed using frequency distributions.

2.9 Ethical considerations

The study protocol was approved by LEPRA - Institute Ethics Committee, Hyderabad, identification number-09/LEPRA/IEC/2024-25. Before initiating the data collection process, written consent was obtained from the respondents or their guardians after explaining the purpose and nature of the survey

3. Results

3.1 Age and Sex Distribution of the Study Population

A total of 2,952 participants were included in the study, with a slightly higher proportion of females (50.8%) than males (49.2%). The age distribution indicates that the majority of the individuals were concentrated in the younger elderly age groups. Specifically, the highest proportion of individuals belonged to the 50–59 years age group (42.6%), followed by those aged 60–69 years (37.8%). A smaller proportion of participants were in the 70–79 years age group (15.0%), while only 4.5% were aged 80 years and above.

Gender-wise distribution across age groups indicates that females constituted a higher proportion than males in the 50–59 years (45.0% vs. 40.2%) and 80–99 years (4.7% vs. 4.3%) age groups. In contrast, males slightly outnumbered females in the 70–79 years age group (17.4% vs. 12.7%), while the distribution in the 60–69 years age group was relatively similar between males and females.

Overall, the sample is skewed towards the younger segment of the older population, with relatively fewer individuals in the oldest age groups.

Table 1
Age and sex distribution of examined individuals

Age (Years)	Males		Females		Total	
	N	%	N	%	N	%
50–59 years	583	40.2	675	45.0	1258	42.6
60–69 years	554	38.2	564	37.6	1118	37.8
70–79 years	253	17.4	190	12.7	443	15.0
80–99 years	62	4.3	71	4.7	133	4.5
Total	1452	49.2	1500	50.8	2952	100%

3.2 Prevalence of blindness and visual impairment

Blindness affected both genders equally, with an overall prevalence of 0.1% (95% CI: 0.03–0.24). Severe visual impairment remained low but was slightly higher among females (0.8%) than males (0.7%). In contrast, moderate and early visual impairment were substantially more prevalent, with moderate impairment affecting 5.8% of males and 6.2% of females, and early impairment affecting 5.4% of males and 6.4% of females. Overall, females consistently exhibited a higher prevalence than males across all levels of visual impairment except blindness, with the largest gender difference observed in early visual impairment, indicating that the burden is concentrated in the early and moderate stages and disproportionately affects women.

3.3 Causes of Blindness and Visual Impairment

Table 2 highlights that untreated cataract was the leading cause of visual impairment (52.2%) and blindness, significantly affecting early, moderate, and severe VI. Refractive error was the predominant cause of early (74.5%) and moderate VI (17.7%), accounting for 42.3% of cases. Cataract surgical complications contributed minimally (2.7%), while glaucoma, though rare (0.5%), caused 33.3% of blindness. Other causes, such as posterior segment disorders and diabetic retinopathy, played minor roles (< 2%).

Table 2
Causes of Visual Impairment

Causes of visual impairment	EVI		MVI		SVI		Blind		Total	
	N	%	N	%	N	%	n	N	%	N
Refractive error	140	74.50%	35	17.70%	0	0.00%	0	0.00%	175	42.30%
Aphakia uncorrected	0	0.00%	1	0.50%	0	0.00%	0	0.00%	1	0.20%
Cataract, untreated	42	22.30%	150	75.80%	22	88.00%	2	66.70%	216	52.20%
Cataract surgical com	5	2.70%	6	3.00%	0	0.00%	0	0.00%	11	2.70%
Glaucoma	0	0.00%	0	0.00%	1	4.00%	1	33.30%	2	0.50%
Diabetic retinopathy	0	0.00%	1	0.50%	0	0.00%	0	0.00%	1	0.20%
Other post. Segment cause	0	0.00%	4	2.00%	2	8.00%	0	0.00%	6	1.40%
All globe/ CNS causes	0	0.00%	1	0.50%	0	0.00%	0	0.00%	1	0.20%
Total	188	100.00%	198	100.00%	25	100.00%	3	100.00%	414	100.00%

3.4 Barriers to Cataract surgery

Need not felt was identified as the most prominent barrier to cataract surgery, accounting for 87.5% of the responses (Fig. 3). Fear of surgery and lack of awareness were the next most commonly reported barriers, although their prevalence remained comparatively low. Gender differences were also observed, with fear of surgery being relatively more common among women, while lack of awareness was more frequently reported among men. Other barriers, including affordability, and lack of access to treatment, constituted only a small proportion of the responses. Detailed sex-wise distribution of barriers is presented in Supplementary Table S2.

3.5 Cataract Surgical Coverage (CSC)

CSC measures the proportion of operable cataracts that have been treated. CSC is highest among individuals with blindness, reaching 100% for both males and females, indicating complete surgical coverage at the most severe level of vision loss. Among those with severe visual impairment, CSC remains very high (98.72% overall), at 98.98% for males and 98.54% for females, showing minimal gender difference. However, coverage declines for moderate visual impairment. For individuals with moderate visual impairment, CSC is 71.86% among males and 79.61% among females. A further drop is observed among

those with low vision, where CSC is 57.51% for males and 63.12% for females. This highlights an equity gap in service utilization, particularly for less severe cases (Table 3).

Table 3
Cataract Surgical Coverage – percentage

Cataract Surgical Coverage – percentage			
	Males	**Females**	**Total**
VA < 3/60	100	100	100
VA < 6/60	98.98	98.54	98.72
VA < 6/18	71.86	79.61	76.14
VA < 6/12	57.51	63.12	60.58

3.6 *Effective Cataract Surgical Coverage (eCSC)*

Figure 4 illustrates the effective cataract surgical coverage. The result highlights that CSC reflects the proportion of operated cases achieving good outcomes (VA ≥ 6/12). At a cutoff of 6/18, 66% of patients achieved good outcomes, with similar rates among males and females. At the stricter cutoff of 6/12, coverage remained above 50%, indicating moderate success in meeting the revised WHO standards.

4. Discussion

This population-based Rapid Assessment of Avoidable Blindness (RAAB) survey conducted in Alipurduar district, West Bengal, provides robust evidence on the current status of blindness and visual impairment among individuals aged 50 years and above. The findings demonstrate a remarkably low prevalence of blindness (0.1%), which is substantially lower than the national estimate of 1.99% reported in the National RAAB survey [3]. This reduction suggests that sustained and targeted interventions under the High Impact Rural Eye Health Programme have been effective in addressing avoidable blindness in this predominantly rural and underserved setting. Comparable evidence from RAAB methodology-based programme settings also suggests that targeted district-level strategies can substantially improve eye health outcomes when implemented systematically [10].

Despite the low prevalence of blindness, moderate visual impairment (5.99%) and early visual impairment (5.89%) remained substantial, indicating that functional visual loss continues to affect a significant proportion of the older population. Uncorrected refractive error was identified as the principal cause of early visual impairment, whereas untreated cataract remained the leading cause of severe visual impairment and blindness. This pattern is consistent with global and regional evidence showing that cataract and refractive error continue to account for the majority of avoidable visual impairment, particularly in low- and middle-income countries [2, 4] These findings highlight the continued need to strengthen primary eye care systems through regular vision screening, affordable refractive correction, and improved access to optical services, especially in rural and aging populations.

Cataract Surgical Coverage (CSC) in Alipurduar was exceptionally high among individuals with blindness and severe visual impairment, reaching 100% at visual acuity (VA) < 3/60 and 98.7% at VA < 6/60. These figures compare favorably with national and regional studies in India, where CSC has generally been lower depending on severity threshold and geographic setting [11]. High CSC at severe thresholds indicates that cataract services are effectively reaching those with advanced visual loss. However, the observed decline in CSC among individuals with moderate and early visual impairment suggests delayed surgical uptake until visual disability becomes more severe. This trend has also been documented in other RAAB analyses and reflects behavioural, perceptual, and socioeconomic barriers to earlier care-seeking [5, 10]. Earlier intervention could reduce prolonged disability and improve quality of life among older adults.

The quality of cataract surgical outcomes in Alipurduar was encouraging, with more than 81% of operated individuals achieving very good postoperative visual outcomes (VA ≥ 6/12), meeting and slightly exceeding World Health Organization benchmarks for quality cataract surgery [3]. This suggests that the programme achieved not only broad service coverage but also satisfactory standards of surgical quality. However, the gap between Cataract Surgical Coverage and Effective Cataract Surgical Coverage (eCSC) indicates that not all surgical interventions produced optimal functional outcomes. Previous studies have similarly demonstrated that residual refractive error, postoperative complications, and insufficient follow-up continue to contribute to suboptimal visual recovery [6]. Therefore, strengthening postoperative refraction services, follow-up care, and surgical quality assurance systems remains essential to maximize the functional benefits of cataract surgery.

Gender disparities in visual impairment and service utilization were relatively limited in this study. Although women demonstrated slightly higher prevalence of early and moderate visual impairment, cataract surgical coverage and postoperative outcomes were comparable to or slightly better than those of men. This finding contrasts with several national and international studies that have reported lower access to cataract services among women, particularly in resource-constrained settings [5]. The relative gender equity observed in Alipurduar may reflect successful programme strategies targeting women and marginalized populations. However, fear of surgery remained more common among women, suggesting that behavioural and psychosocial barriers persist despite equitable structural access. Gender-sensitive counselling and community engagement therefore remain important components of programme strengthening.

A notable finding of this study was that the predominant barrier to cataract surgery was lack of perceived need (“need not felt”), reported by 87.5% of participants. This is consistent with findings from other RAAB studies across South Asia, where delayed care-seeking is frequently driven by low perceived severity, normalization of progressive vision loss, or insufficient awareness of treatment benefits [10]. This finding indicates that service availability alone is insufficient to ensure timely uptake. Behaviour change communication, targeted awareness campaigns, and integration of eye health promotion into primary healthcare systems are therefore essential to encourage earlier intervention and reduce avoidable visual disability.

Overall, the findings from Alipurduar demonstrate that substantial reductions in avoidable blindness are achievable in rural and socioeconomically marginalized populations through comprehensive programme implementation. High cataract surgical coverage and strong surgical outcomes highlight the effectiveness

of sustained eye health initiatives. However, persistent moderate and early visual impairment, delayed surgery uptake, and remaining quality gaps indicate that future strategies should prioritize refractive services, early cataract identification, behavioural interventions, and continuous quality improvement. Addressing these areas will be critical to sustaining progress and advancing toward the long-term elimination of avoidable blindness.

5. Conclusion

The High Impact Rural Eye Health Programme in Alipurduar District has demonstrated remarkable success in reducing the prevalence of blindness to 0.1% in the target population, far exceeding its target of 0.3%. This achievement underscores the programme's effective outreach and targeted interventions, particularly in addressing blinding cataracts and significant uncorrected refractive errors, which are the leading causes of visual impairment. With a Cataract Surgical Coverage (CSC) of 100% for severe visual impairment (VA < 3/60) and over 98% for severe impairment (VA < 6/60), the programme has ensured comprehensive access to surgical care for the most vulnerable groups. Additionally, over 81% of cataract surgeries resulted in very good outcomes (VA ≥ 6/12), reflecting high surgical quality and effective postoperative care. These successes highlight the programme’s pivotal role in alleviating avoidable blindness in this remote region of West Bengal. While the programme has made significant progress, there are opportunities to further enhance its impact. Moderate (5.99%) and early (5.89%) visual impairments are still prevalent, highlighting the importance of continuing early detection and treatment, particularly for refractive errors. Strengthening community awareness and providing clear guidance can help address barriers to cataract surgery, such as a lack of perceived need or concerns about the procedure. Although gender disparities were minimal, a focus on gender-sensitive approaches can ensure even more equitable outcomes for women. By building on its successes and addressing these areas, the programme can continue to deliver sustainable and high-quality eye care for all.

Declarations

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Authors and Affiliations

Sightsavers India

Ananta Basudev Sahu, Sandeep Buttan, Kamal Kumari Chakraborty, Sampa Paul

Authors’ contributions

ABS and SB collaborated on the design of the survey and development of the data collection tool. ABS took the lead and SB overseeing training and conducting all quantitative analyses. KKC provided support for data collection and contributed to report writing. SP provided logistic support for this survey and RN provided

overall guidance conducting and commissioning of the study. All authors participated in the creation, review and approval of the final manuscript.

Ethics declarations

Ethics approval and consent to participate

The study protocol was approved by LEPRA - Institute Ethics Committee, Hyderabad, identification number-09/LEPRA/IEC/2024-25. Before initiating the data collection process, written consent was obtained from the respondents or their guardians after explaining the purpose and nature of the survey

Competing interests

The authors declare that they have no competing interests.

References

1. World Health Organization. *World report on vision*. Geneva: WHO; 2019. Retrieved from https://www.who.int/publications/i/item/world-report-on-vision
2. Abou-Hanna JJ, Leggett AN, Andrews CA, Ehrlich JR. Vision impairment and depression among older adults in low- and middle-income countries. Int J Geriatr Psychiatry. 2021;36(1):64–75. https://doi.org/10.1002/gps.5394
3. 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*. https://doi.org/10.1371/journal.pone.0271736
4. Muhit, M., Wadud, Z., Islam, J., Khair, Z., Shamanna, B., Jung, J., & Khandaker, G. (2016). Generating Evidence for Program Planning: Rapid Assessment of Avoidable Blindness in Bangladesh. *Ophthalmic Epidemiology*, *23*(3), 176–184.https://doi.org/10.3109/09286586.2016.1155716
5. Jolley E, Buttan S, Engels T, Gillani M, Jadoon MZ, Kabona G, et al. Prevalence of visual impairment and cataract surgical coverage: associations with sex, disability and economic status. *Ophthalmic Epidemiol*. 2020;27(6):429–37. https://doi.org/10.1080/09286586.2020.1768553
6. McCormick I, Mactaggart I, Bastawrous A, Burton MJ, Ramke J. Effective cataract surgical coverage in adults aged ≥50 years. *Lancet Glob Health*. 2022;10(12):e1744–53., https://doi.org/10.1016/S2214-109X(22)00419-3
7. Sightsavers India. Baseline rapid assessment of avoidable blindness (RAAB) survey in Alipurduar district. Unpublished report; 2021.
8. Government of India. *Census of India 2011*. New Delhi: Office of the Registrar General; 2011.
9. Government of West Bengal. *District statistical handbook: Alipurduar*. Kolkata: Bureau of Applied Economics and Statistics; 2021..
10. McCormick I. The rapid assessment of avoidable blindness (RAAB) survey methodology. Community Eye Health. 2022;35(117):4. Epub 2023 Jan 30. PMID: 37007832; PMCID: PMC10061257.https://pmc.ncbi.nlm.nih.gov/articles/PMC10061257/

11. Vashist P, Sarath S, Gupta V, Gupta N, Senjam SS, Shukla P, Grover S, Shamanna BR, Vemparala R, Wadhwani M, Bhardwaj A, Titiyal JS. Cataract surgical coverage in Indian population aged 50 years and above. Indian J Ophthalmol. 2025 Mar 1;73(3):347-351. doi: 10.4103/IJO.IJO_1398_24. Epub 2024 Dec 27. PMID: 39728729; PMCID: PMC11994170.https://doi.org/10.4103/IJO.IJO_1398_24
12. Deshpande M. Vision 2020: Right to Sight - India. Med J Armed Forces India. 2008 Oct;64(4):302-3. doi: 10.1016/S0377-1237(08)80002-0. Epub 2011 Jul 21. PMID: 27688561; PMCID: PMC5035261. https://pmc.ncbi.nlm.nih.gov/articles/PMC5035261/

Figures

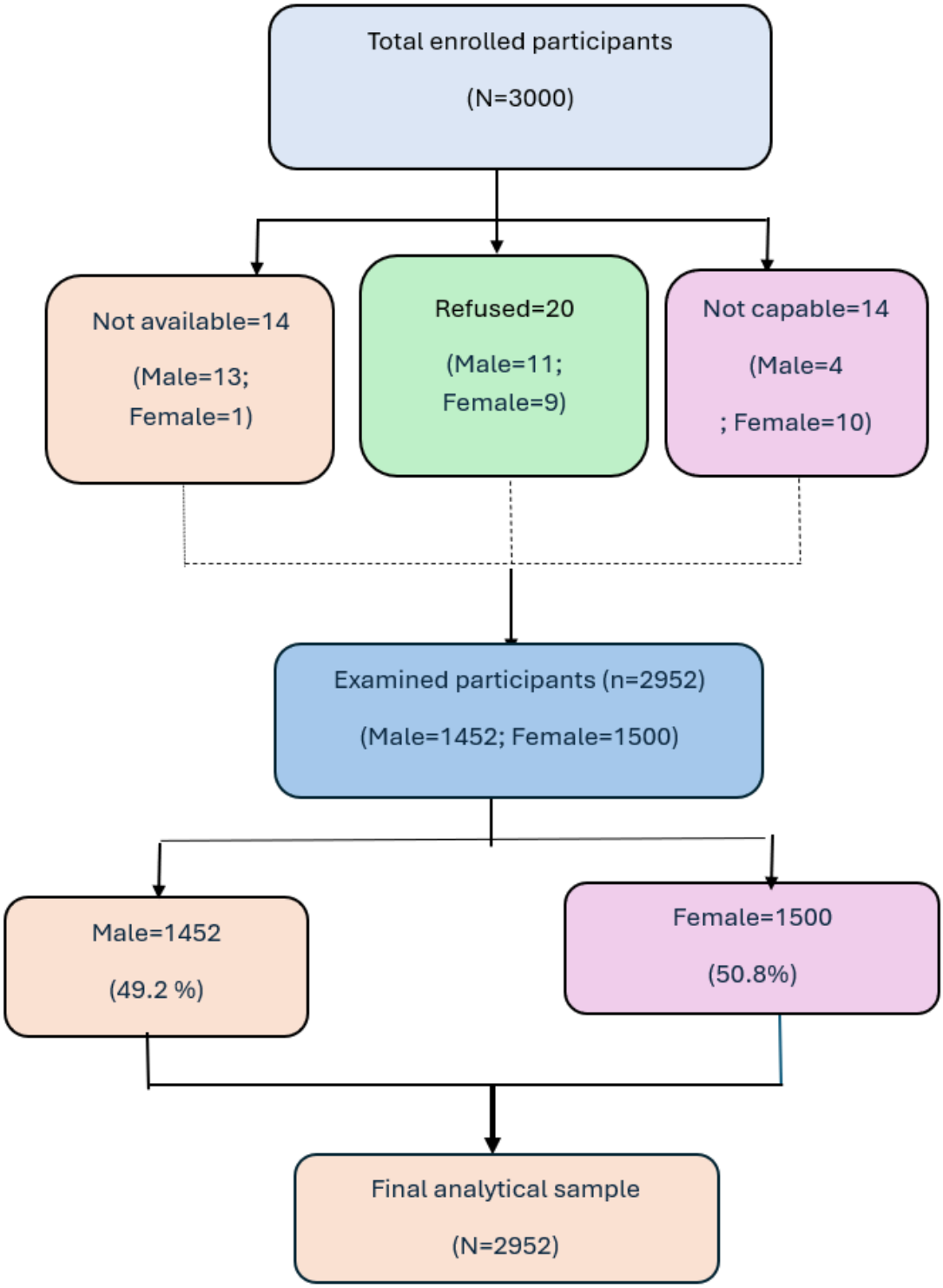


Figure 1

Inclusion of study participants

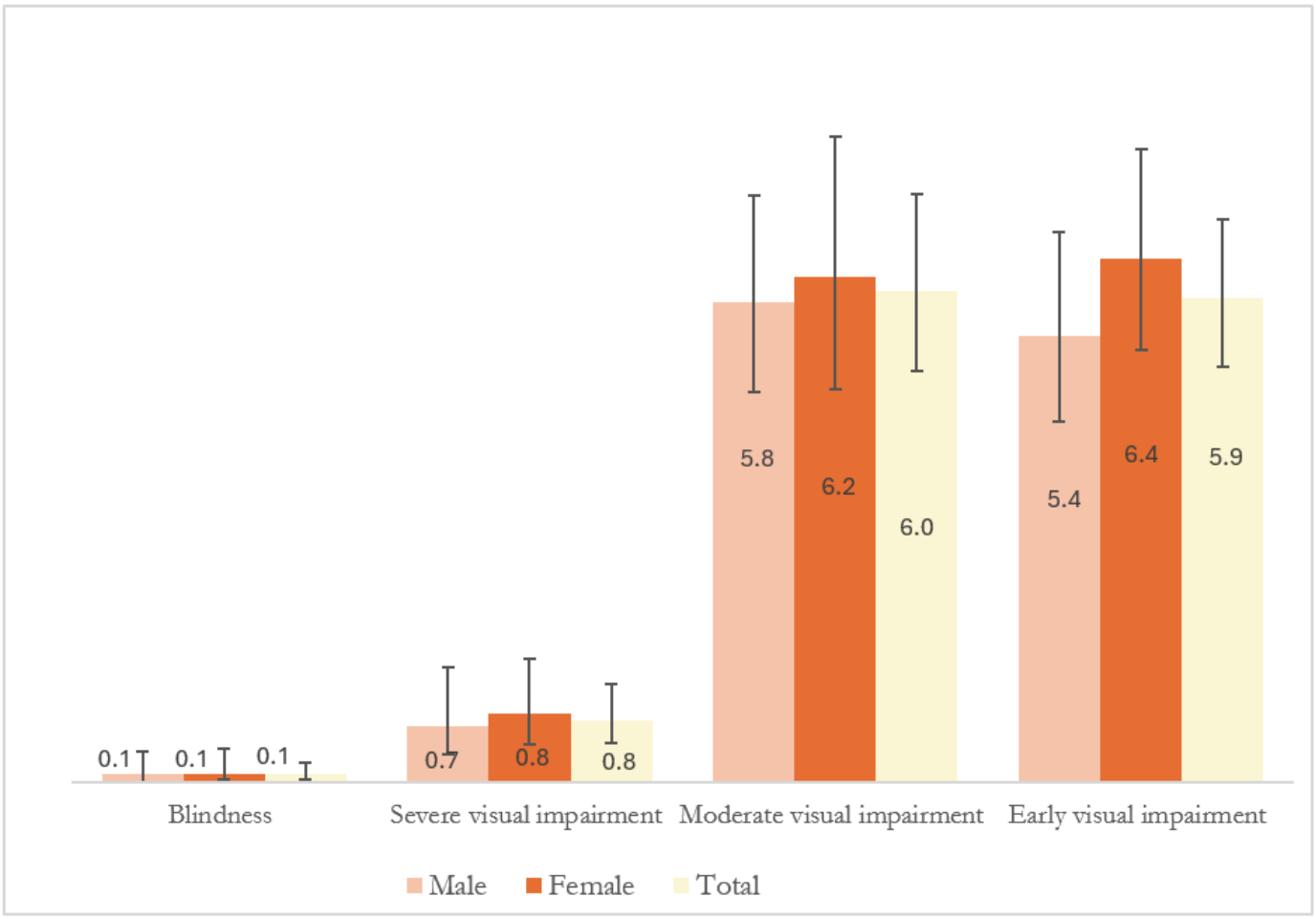


Figure 2

Age-adjusted prevalence of blindness, severe visual impairment (SVI), moderate visual impairment (MVI), and early visual impairment (EVI) by sex among individuals aged 50 years and above

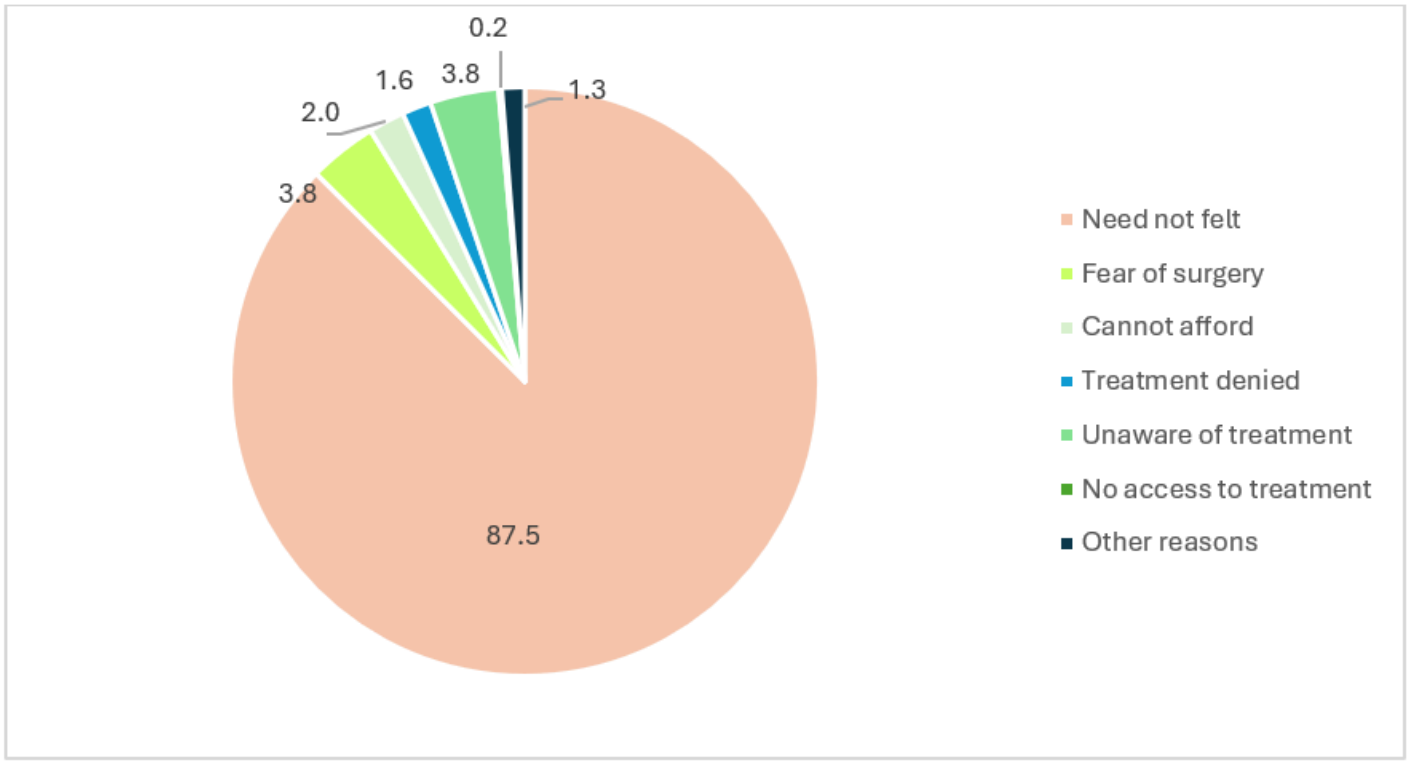


Figure 3

Barriers to cataract surgery

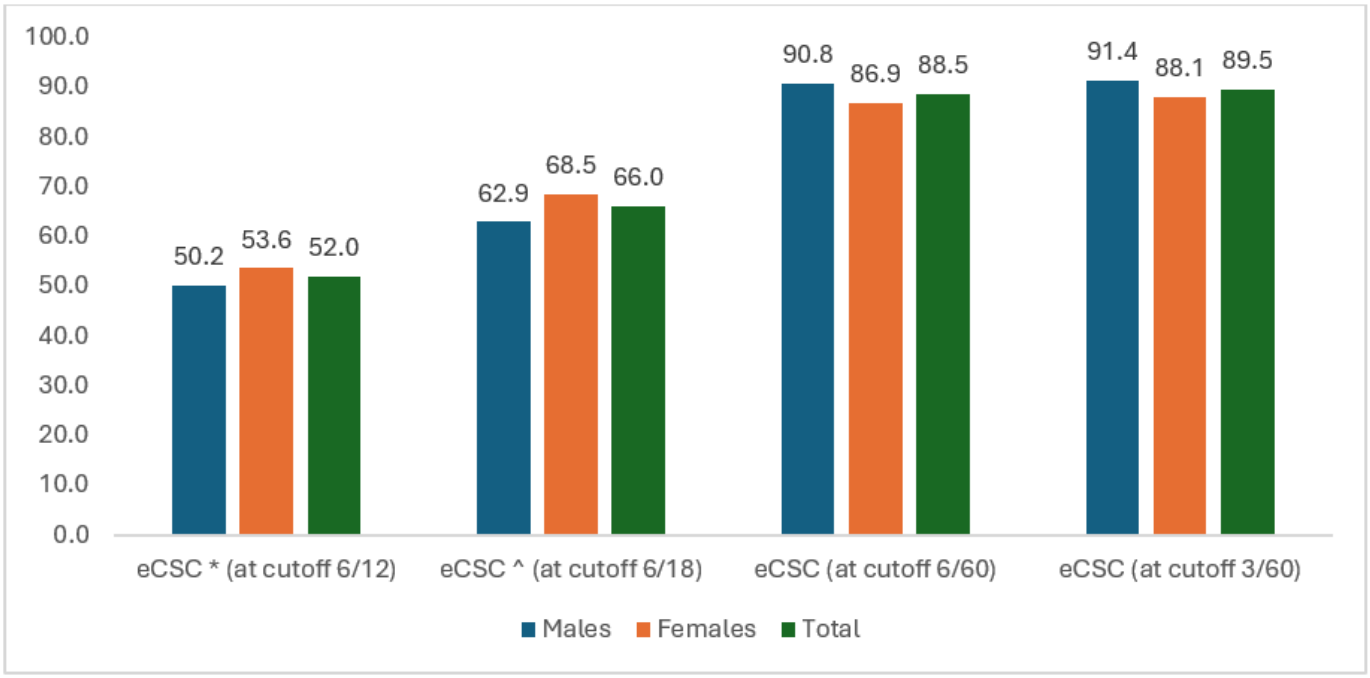


Figure 4

Effective Cataract Surgical Coverage (eCSC)

Note: ^ as per old definition, * revised WHO definition

Supplementary Files

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- SupplementaryTableS1.docx