## **Original Research Article**

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# Why rural communities in India delay seeking eye care?

## Maneck D. Nicholson, Radhika Krishnan\*, Ashwini Rogye

Department of Public Health, Shantilal Shanghvi Eye Institute, Wadala, Mumbai, Maharashtra, India

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# \*Correspondence:

Dr. Radhika Krishnan,

E-mail: Radhika.Krishnan@ssei.ind.in

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#### **ABSTRACT**

**Background:** The purpose of the study was to assess the willingness to use eye care services among individuals with self-reported visual difficulties in rural Maharashtra, and to identify demographic and psychosocial factors influencing service uptake.

**Methods:** A cross-sectional survey was conducted among participants with visual complaints during rural outreach camps. Data on sociodemographic characteristics, duration of visual symptoms, and willingness to utilize various eye care services were collected. Logistic regression was used to evaluate associations between demographic variables and the desire to use each service.

**Results:** While willingness to undergo an eye examination was high (91.6%), the uptake of treatment services was significantly lower: 67.4% for eyeglasses, 56.7% for medications, and 58.5% for surgery. Older age, longer symptom duration, and unemployment were negatively associated with willingness to use eyeglasses. Literacy and employment status showed no consistent link with willingness to accept surgery or medications. Notably, no demographic variable strongly predicted willingness for surgery, indicating that broader awareness and perception-related barriers are influential.

**Conclusion:** Despite the availability of free services, a significant number of individuals with visual complaints remain hesitant to seek treatment particularly surgery and medications. These results underscore the importance of targeted educational efforts, community awareness programs, and trust-building initiatives to promote service utilization among underserved populations.

Keywords: KAP, Rural India, Eye care, Government schemes, Perception, Preventable blindness

### INTRODUCTION

Avoidable blindness remains a significant public health issue in India, particularly among underserved rural communities. National survey data indicate that approximately 4.95 million people are blind and 70 million are visually impaired. Cataracts are the primary cause, accounting for over 60% of bilateral blindness in adults aged 50 years and older.<sup>1</sup>

The rapid assessment of avoidable blindness (RAAB, 2015–2019), conducted under the National Programme for Control of Blindness and Visual Impairment, showed that Maharashtra's performance is below the national average, with a blindness prevalence of 2.06% and a visual

impairment rate of 12.98% (presenting vision, age  $\geq$ 50 years).<sup>2</sup>

A separate RAAB was carried out in a tribal district of Maharashtra, involving 2,005 out of 2,300 adults aged 50 years or older. When using the presenting vision, the figures reported were 1.87% for blindness, 6.72% for severe visual impairment (SVI), and 19% for moderate visual impairment (MVI).<sup>3</sup> While un-operated cataract accounted for 77% of visual loss, 41% of affected participants cited a lack of awareness about cataract surgery.<sup>3</sup> These findings highlight the need for intensified community education and eye health promotion initiatives in the state.

The Government of India has launched several large-scale initiatives to prevent and control blindness, especially cataracts. Chief among these is the National Programme for Control of Blindness and Visual Impairment (NPCBVI), introduced in 1976. In Maharashtra, the Mahatma Jyotiba Phule Jan Arogya Yojana (MJPJAY) plays a crucial role by covering the costs of various non-cataract eye surgeries, including glaucoma, cornea, oculoplasty, and retinal procedures, for economically disadvantaged populations.

Despite these efforts, barriers remain in ensuring the effective use of eye care services. Numerous studies have pointed out the underutilization of cataract surgical services and poor compliance with treatment regimens for chronic eye conditions, even when services are free.

To develop effective, locally tailored interventions, it is crucial to understand the baseline knowledge, attitudes, and health-seeking behaviors related to eye health. Raigad district in Maharashtra is mainly an agricultural area that has recently improved access to eye-care services through new highways and waterways. However, little is known

about the factors that influence care-seeking behavior. This study aimed to assess the knowledge, attitudes, and practices regarding eye health among adults in this region.

#### **METHODS**

This cross-sectional study assessed the knowledge and attitudes related to eye care among adults aged 40 years or older residing in rural areas surrounding our eye institute in Raigad district, Maharashtra. Ethical clearance was obtained from the Institutional Ethics Committee of Shantilal Shanghvi Eye Institute (SSF/IRB/0018/2025). All procedures conformed to the Declaration of Helsinki and good clinical practice (GCP) guidelines. Verbal informed consent was obtained from each participant.

The study was conducted over four months, from November 2024 to February 2025, during outreach eye screening programs organized by the Shantilal Shanghvi Eye Institute, Mumbai, India, in peripheral villages across the Raigad district in rural Maharashtra (Figure 1). Lowincome, agrarian, or daily-wage-earning communities predominantly inhabited these villages.



Figure 1: Map showing the locations of the programs and their distances from the Shantilal Shanghvi Eye Institute, Wadala, Mumbai.

The study employed a structured questionnaire that had been previously used in another similar study in rural southern India. All participants attending outreach programs conducted by SSEI in that area were invited to participate. Exclusion criteria included people aged <18 years, those with cognitive impairments that hindered the interview or refusal to provide consent. Trained optometrists and field staff administered the questionnaire in Marathi after obtaining verbal informed consent. The survey collected demographic details including age,

gender, literacy status, and occupation, along with responses to 15 closed-ended KAP questions.

Each interview lasted approximately 8 to 10 minutes and was conducted before the participant's eye examination. To ensure confidentiality, all data were anonymized and securely entered into a protected database. The questionnaire underwent a rigorous forward-backwards translation process to ensure semantic and cultural equivalence in Marathi. A bilingual expert first translated the questionnaire from English to Marathi, followed by an

independent back-translation into English. A panel comprising a clinician and field workers then reviewed the translation for cultural appropriateness. The tool was pilottested on a small sample (with pilot data excluded from final analysis), after which minor refinements were made to the wording based on feedback. The final Marathivalidated instrument included demographic items (age, sex, literacy, occupation) and 15 closed-ended questions that assess knowledge of common eye diseases, attitudes toward surgery and treatment, and vision care practices (Table 1).

Table 1: Questionnaire.

S. no.	Survey questions
1	Do you have any eye-related problems?
2	Does your vision problem affect your daily activities?
3	How long have you had the vision problem?
4	Do you know the cause of your vision problem?
5	What other chronic disease(s) do you have?
6	How would you rate your understanding of the role of diabetes/HT in eye health
7	Previous eye examination: Have you gone for an eye exam before?
7a	If yes, where was the exam done?
7b	Outcome of that eye exam
8	Are you aware of any government schemes supporting free eye-care?
9	If prescribed eyeglasses, would you use them?
10	If prescribed medications, would you take them?
11	If advised free eye surgery, would you undergo it?
12	If follow-up care were needed, would you travel?
13	Can you afford the cost of eye exams in private clinics?
14	Distance to nearest eye-care provider
15	If given free educational materials on eye health, would you be interested?

#### Statistical analysis

This study examined the relationship between various demographic and contextual factors and participants' attitudes toward eye health interventions, including the use of eyeglasses, medication, and surgical treatment. Each outcome variable, representing willingness to accept eyeglasses, medication, or surgery, was binary (coded as 1=yes, 0=no). Independent variables included age group, sex, educational status, socio-economic classification (based on ration card type), employment status, prior awareness of government health schemes, the impact of vision problems on daily life, duration of vision-related complaints, and history of previous eye examinations. Bivariate binary logistic regression analysis was conducted to assess the relationship between each independent

variable and the outcomes of interest. Each predictor was included in a separate model to determine its crude association with the outcome. The results are presented as odds ratios (OR) with corresponding 95% confidence intervals (CI) and p values. A p value less than 0.05 was considered statistically significant. All analyses were conducted using IBM statistical package for social the sciences (SPSS) statistics, version 28.0.0.0. This approach was selected in line with the study's exploratory design, enabling the identification of potential population-level factors that may inform the development of targeted counselling and health promotion strategies related to eye health. No multivariable model was built, as the primary goal was to explore and describe potential associations rather than to identify independent predictors. However, the limitations of unadjusted analysis in controlling confounding are acknowledged and taken into account when interpreting the results.

#### **RESULTS**

The sample consisted of 460 participants, with an average age of 59.1 years, ranging from 22 to 92 years, primarily comprising middle-aged to elderly individuals. Gender distribution was nearly equal. Educational attainment was low, with over 60% having less than a 10th-grade education. Most belonged to lower socio-economic groups, with 19.3% from families with annual income below Rs. 15000 and 71.5% with annual income below Rs. 1 lakh. Employment was limited, with only 42% of the population employed (Table 2).

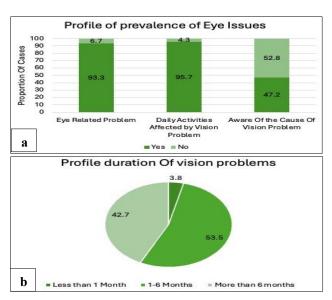


Figure 2: (a) Bar graph depicting the profile of eye health issues in the community, showing the proportion of individuals with self-reported eye problems, those whose daily activities are affected by vision issues, and the percentage of individuals aware of the cause of their vision problem, and (b) pie chart showing the duration of vision problems among respondents, categorized into less than 1 month, 1–6 months, and more than 6 months.

Eye-related problems were highly prevalent, affecting 93.3% of respondents. A large majority (95.7%) reported that these issues interfered with daily activities; however, only 47.2% were aware of the cause of their vision problems (Figures 2a and b).

Table 2: Demographic data (n=460).

Parameters	N							
Age (years)								
Mean	59.10							
SD	12.61							
Range	22-92							
Gender (%)								
Male	232 (50.4)							
Female	228 (49.6)							
Education (%)								
Illiterate	129 (28.0)							
Less than 10 <sup>th</sup>	158 (34.3)							
10 <sup>th</sup> to 12 <sup>th</sup>	105 (22.8)							
More than 12 <sup>th</sup>	21 (04.6)							
Not known	47 (10.2)							
Socio-economic status								
Below poverty line (yellow card)	89 (19.3)							
Above the poverty line (orange card)	329 (71.5)							
Non-priority household (white card)	09 (02.0)							
Not known	33 (07.2)							
Both	38 (08.3)							
None	295 (64.1)							
Not known	09 (02.0)							
Unemployed	226 (49.1)							
Not known	41 (08.9)							
Hypertension	75 (16.3)							
Employment (%)								
Employed	193 (42.0)							
Chronic disease (%)								
Diabetes mellitus	43 (09.3)							

Sixty percent of participants had previously undergone an eye exam. Hospitals were the most common location for exams (44.5%), with 67.8% requiring further treatment (Figures 3a and b).

There was generally a high willingness to accept interventions, with rates of 69% for eyeglasses, 80% for medications, and 76.7% for surgery. Among those unwilling to use eyeglasses or take medications, affordability was the most common reason. In contrast, for surgery, most of the unwilling respondents cited fear and concerns, highlighting the need for better counselling.

Willingness to accept eye care interventions varied across demographic and socioeconomic factors. Females consistently showed greater acceptance across all interventions compared to males, with statistically significant higher odds for eyeglasses (OR: 1.73, 95% CI: 1.16–2.58), medications (OR: 1.81, 95% CI: 1.13–2.89), and surgery (OR: 1.67, 95% CI: 1.02–2.75). Socioeconomic status emerged as a key determinant; participants below the poverty line had significantly lower odds of accepting medications (OR: 0.49, 95% CI: 0.25–0.97), while those above the poverty line had significantly higher odds of accepting surgery (OR 3.24, 95% CI: 1.83–5.74) (Table 3).

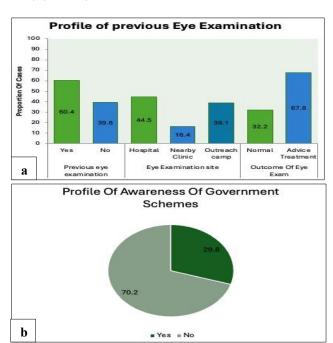


Figure 3: (a) Bar graph illustrating the profile of eye examinations among community members, showing the proportion who had previously undergone an eye examination, the location of the examination, and the reported outcomes, and (b) pie chart showing the percentage of community members who are aware versus unaware of the availability of government eye care schemes.

Awareness of government schemes was positively and significantly associated with willingness to use eyeglasses (OR: 5.41, 95% CI: 2.97–9.85) and medications (OR: 3.78, 95% CI: 1.88–7.58), but was inversely associated with willingness for surgery (OR: 0.52, 95% CI: 0.31–0.88), suggesting the need for different messaging strategies for surgical interventions.

Prior eye examinations strongly predicted acceptance of eyeglasses (OR: 1.90, 95% CI: 1.27–2.84) and medications (OR: 2.79, 95% CI: 1.74–4.47), underscoring the importance of early screening and sustained engagement.

Surprisingly, only 29.8% of participants were aware of government schemes for eye health (Figure 3).

Table 3: Willingness to use eyeglasses, to take medication and to undergo surgery.

	Willingness to use eyeglasses Willingness to have medication							a a 1 · .	Williamon to undergo com-				
Predictor		e eyegla  95%			Willingness to have medication O 95%				Willingness to undergo surgery  O 95%				
variables	N (%)	O R	CI	P	N (%)	R	CI	P	N (%)	R	CI	P	
Age (years)	n=316				n=364				n=273				
20 to 40	43 (13.6)				46 (12.6)	-			37 (13.6)				
41 to 60	129 (40.8)	0.	-0.33 (0.54	*0.0	141 (38.7)	0.	-0.07 (0.68	0.67	110 (40.3)	1.	0.00 (0.72–	0.98	
61 to 80	137 (43.4)	72	0.96)	24	169 (46.4)	93	- 1.29)	2	120 (44.0)	00	1.39)	8	
More than 80	07 (02.2)				08 (02.2)				06 (02.2)				
Gender	n=316		0.55		n=364		0.50		n=273				
Male	172 (54.4)	1.	0.55 (1.16	*0.0	193 (53.0)	1. 81	0.59 (1.13	*0.0	150 (54.9)	1.	0.51 (1.02–	*0.0	
Female	144 (45.6)	73	- 2.58)	07	171 (47.0)	81	- 2.89)	14	123 (45.1)	67	2.75)	42	
Education	n=309		0.46		n=333		0.50		n=273				
Literate	101 (32.7)	1	0.46 (0.94	0.08	108 (32.4)	1	0.59	0.05	78 (28.6)		-0.13	0.62	
Illiterate	208 (67.3)	1. 58	- 2.64)	0.08	225 (67.6)	1. 80	(0.99 - 3.27)	0.05 4	195 (71.4)	0. 88	(0.51– 1.49)	0.62 9	
Socio- economic status	n=299				n=337				n=253				
Below poverty line	240 (80.3)	1.	0.24 (0.77	0.34	260 (77.2)	0.	-0.72 (0.25	*0.0	217 (85.8)	3.	1.17	*<0.	
Above poverty line	59 (19.7)	27	2.09)	6	77 (22.8)	49	- 0.97)	39	36 (14.2)	24	(1.83– 5.74)	001	
Employment status	n=311				n=345				n=273				
Employed	127 (40.8)	0.	-0.79 (0.29	*0.0	153 (44.3)	0.	-0.31 (0.44	0.23	106 (38.8)	1.	0.27 (0.78–	0.30	
Unemployed	184 (59.2)	45	- 01 0.71)	01	192 (55.7)	73	- 1.23)	5	167 (61.2)	32	2.21)	0	
Aware of govt. schemes	n=304				n=352				n=266				
Yes	117 (38.5)		1.69		119 (33.8)		1.33		82 (30.8)		0.65		
No	187 (61.5)	5. 41	(2.97 - 9.85)	*<0. 001	233 (66.2)	3. 78	(1.88 - 7.58)	*<0 .001	184 (69.2)	0. 52	-0.65 (0.31– 0.88)	*0.0 14	
Vision problem affects daily activities	n=306				n=352				n=267				
Yes	295 (96.4)	1.	0.49 (0.64 - 4.17)	0.30	338 (96.0)	1.	0.35 (0.50	0.51	257 (96.3)	2. 53	0.93 (0.93–	0.06 9	
No	11 (03.6)	64			14 (04.0)	42	- 4.05)	2	10 (03.7)		6.89)		
Duration of vision problem	n=271				n=312				n=235				
Less than 1 month	11 (04.1)	0.	-0.73 (0.32	*<0.	14 (04.5)	0.	-0.34 (0.45	0.13	09 (03.8)	1.	0.26 (0.77–	0.33	
1–6 months	163 (60.1)	48		- 0.72)	001	171 (54.8)	71	- 1.11)	3	136 (57.9)	29	2.16)	2

Continued.

Predictor variables	Willingness	e eyegla	isses	Willingness to have medication				Willingness to undergo surgery				
	N (%)	O R	95% CI	P	N (%)	O R	95% CI	P	N (%)	O R	95% CI	P
More than 6 months	97 (35.8)				127 (40.7)				90 (38.3)			
Previous eye examina-tion	n=316				n=364				n=273			
Yes	207 (65.5)	1.	0.64 (1.27	*0.0	239 (65.7)	2.	1.03 (1.74	*<0	170 (62.3)	0.	-0.12 (0.53–	0.64
No	109 (34.5)	90	2.84)	02	125 (34.3)	79	- 4.47)	.001	103 (37.7)	89	1.48)	5
Presence of DM	Presence of DM/HTN											
Yes			0.49				0.59				-0.17	
No		1. 63	(1.05 - 2.53)	*0.0 28		1. 81	(1.07 - 3.06)	*0.0 28		0. 84	(0.50– 1.41)	0.51 5

#### **DISCUSSION**

The findings from this study highlight a significant burden of eye-related problems in rural Maharashtra, with 95.7% of respondents reporting that these issues interfere with their daily activities, significantly affecting quality of life and productivity. Although symptoms persist in most participants (with 53% experiencing them for over a month), only 47% understand the underlying cause of their vision loss. This reveals a critical gap in eye health literacy and access to community-level services similar to prior reports from rural India.<sup>4,5</sup>

Although more than half of the participants had previous eye examinations, the rate of receiving definitive treatment remained low. This supports earlier findings that initial access does not always lead to ongoing care.<sup>6,7</sup> Most eye exams were held at hospitals or outreach programs. Geographic accessibility remains a challenge, with over one-third of people needing to travel more than 10 km for care, a known obstacle in similar rural areas.<sup>8</sup>

Regression analysis identified several factors influencing willingness to accept eye care interventions. Females were significantly more likely than males to accept eyeglasses (OR: 1.73, p=0.007), medications (OR: 1.81, p=0.014), and surgery (OR: 1.67, p=0.042). This contrasts with earlier findings and highlights a stronger gender-based preference for eye care in our study population, suggesting that women in this rural setting may be more proactive about seeking treatment.<sup>9</sup>

Willingness to use eyeglasses was significantly lower among older individuals, especially those aged 61–80 years (OR: 0.72, p=0.024) and among those with longer-standing vision problems (OR: 0.48 for >6 months, p<0.001), indicating that both age-related factors and prolonged symptom duration may reduce motivation or perceived benefit, emphasizing the need for targeted interventions in these groups.

Unemployed individuals were significantly less willing to use eyeglasses (OR: 0.45, p=0.001), highlighting economic and motivational barriers to accessing even low-cost solutions. A previous eye examination significantly increased the likelihood of accepting both eyeglasses (OR: 1.90, p=0.002) and medications (OR: 2.79, p<0.001), suggesting that prior engagement with the health system may build trust and openness to treatment.<sup>10</sup>

Willingness to undergo surgery remained moderate (76.7%) despite assurances of free services. Consistent with earlier studies in rural South India and China fear and mistrust, rather than cost or access, appear to be significant barriers. These results emphasize the need for interventions that extend beyond economic support. Educational programs, especially those that clarify the safety and effectiveness of cataract surgery, could be beneficial. For instance, Liu et al showed in a rural Chinese RCT that surgery uptake increased significantly with targeted education. Similar RCTs in India could help develop messaging tailored to local needs.

Unlike eyeglasses and medications, willingness to undergo surgery was not strongly influenced by most demographic or socio-economic factors. The only significant predictors were gender and awareness of government schemes, as females were more likely to accept surgery (OR: 1.67, p=0.042). In contrast, awareness of schemes was paradoxically associated with a lower willingness (OR: 0.52, p=0.014). This warrants further investigation to understand why the uptake was low and whether factors beyond cost affect the decision to undergo surgery. Previous studies have highlighted mistrust and fear related to free services provided through government schemes.<sup>14</sup>

In our study, literate individuals were more willing to use eyeglasses and accept eye medications compared to illiterate individuals, although these differences did not reach statistical significance. This finding contrasts with earlier results, which have traditionally linked a lack of formal education to poor follow-up. 10 The willingness to undergo surgery was somewhat lower among literate

participants; however, this difference was not significant. These findings suggest that literacy may positively influence the acceptance of non-invasive interventions, such as eyeglasses and medications, while factors beyond education level may influence decisions regarding surgery.

Awareness of government schemes was low (30%), and paradoxically, awareness was linked to a lower willingness to undergo surgery (OR 0.52, p=0.014). The initiatives by the Indian government under their flagship program, Ayushman Bharat, specifically the Prime Minister Jan Arogya Yojana (PMJAY), provide an effective way to deliver equitable health services to even the most remote communities, where beneficiaries receive a defined benefit cover of Rs. 5 lakhs per family per year. The scheme allows them to access cashless benefits at any public or private empanelled hospital nationwide. A lack of awareness about these schemes indicates a significant disconnect in rural areas. This finding is reflected in other Indian contexts, likely due to a deep-rooted mistrust in public health services, possibly because of inconsistent quality, lack of follow-up, or poor community experiences. 15 This perception barrier necessitates policy and communication reform to enhance trust and transparency in government-provided care.

Literacy appeared to have a complex role. Although not statistically significant, literate individuals showed higher acceptance of non-invasive treatments but lower (non-significant) willingness for surgery. This could indicate more discerning attitudes or heightened concerns about procedural quality, as seen in other rural Indian studies. <sup>16,17</sup> Further qualitative research could explore the interplay of literacy, trust, and perceived care quality.

A crucial limitation of this study is the sampling bias. Participants were drawn from vision screening camps, inherently selecting those already inclined to seek care. As such, these findings may overestimate true willingness or service usage in the general population. The lower participation among males' further limits generalizability and statistical power, particularly since prior studies have linked male sex with higher cataract surgical coverage. The reasons for male non-participation merit dedicated investigation, as they may reflect deeper gender-specific barriers.

Finally, while our study focused on knowledge and attitudes towards eye care, future research could explore the most effective methods to engage with the community and build trust to improve eye health-seeking behaviour.

#### **CONCLUSION**

In conclusion, this study underscores the dual challenge of low awareness and perceptual barriers in accessing eye care in rural Maharashtra. Educational interventions, trustbuilding strategies, and consistent quality of care are pivotal to improving service uptake. Future programs should also evaluate the impact of community-driven health promotion, integration of chronic disease services, and strengthening local health systems to deliver reliable, respectful, and patient-centred care.

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Institutional Ethics Committee

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