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Original Research Article

Barriers to attending one-month review post cataract surgery by patients availing free cataract treatment in India

Pankaj Vishwakarma*, Amit Mondal, Dhanaji Ranpise, Lijiraj Sundararaj, Shajer Shaikh, Shobhana Chavan, Elizabeth Kurian

Department of Programme Impact, Mission for Vision, Mumbai, Maharashtra, India

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***Correspondence:**
Pankaj Vishwakarma,
E-mail: pvishwakarma@missionforvision.org.in

ABSTRACT

Background: Cataract is a leading cause of blindness in India, with free cataract surgeries widely performed. However, follow-up adherence remains a challenge, impacting visual outcomes. This study investigates factors influencing non-compliance with one-month follow-up visits among patients undergoing free cataract surgery.
Methods: A retrospective multicentre study was conducted across 15 locations in India, including 14 states. Data were collected from 851 patients (≥18 years) who missed their follow-up, using a validated telephonic questionnaire covering demographics, socioeconomic status, and perceived barriers. Chi-square tests were applied to analysed correlations.
Results: Of the participants, 51% were male, 53% were aged ≥65, and 68% were illiterate. Most (64%) were married, and 34% had income-generating activities. Post-surgical spectacle use was low (8%), though 79% achieved good vision (6/6–6/12) with pinhole correction. Follow-up adherence was 59% at camps, 37% at hospitals, and 4% at other locations. Key reasons for missing follow-ups included forgetting (20%), household/livelihood commitments (16%), and lack of an escort (8%). Financial and transportation barriers affected only 2%. Despite 98% recognizing follow-up importance, 22% were unwilling to attend future visits, with 38% requiring support, mainly transportation (62%). Age significantly correlated with satisfaction (χ^2=82.86, p<0.0001), but gender and spectacle use showed no correlation.
Conclusions: Forgetfulness, socioeconomic constraints, and logistical barriers hinder follow-up adherence. Enhancing patient education, community outreach, and transportation support can improve compliance. Future interventions should focus on targeted awareness campaigns and technology-driven reminders to optimize post-surgical visual outcomes.

Keywords: Barriers to compliance, Cataract surgery, Follow-up adherence, Patient education, Socioeconomic factors, Visual outcomes

INTRODUCTION

Cataract is a common cause of visual impairment in India. It is responsible for 80% of blindness in the country. The prevalence of cataracts in India is reported to be 58% in North India and 53% in South India among the older age group (>60 years).[1-3] The signs and symptoms of cataracts include hazy or cloudy vision, decreased night vision, sensitivity to light, double vision, and seeing halos around lights.[6,7] Cataract surgery is one of the most common procedures performed worldwide and has evolved. It is the only established treatment method for visually significant cataracts, defined as

having a visual acuity of 20/40 or worse. Cataract surgery has become a refractive procedure to achieve spectacle independence.[4,5] The importance of pre- and post-cataract surgery follow-up is to ensure that the patient's eye is healthy and healing properly. It allows the clinician to monitor the effectiveness of the prescribed eye drops and make any necessary adjustments. Follow-up appointments also allow for the measurement of glasses and the updating of the eyeglass prescription. Each patient heals differently, so the timing of follow-up appointments may vary. Patients need to contact their clinician if they experience persistent pain, light flashes, or new spots in front of their eye during recovery.[8-11] This is crucial for ensuring proper care and monitoring their vision. In India, the one-month post-cataract surgery follow-up rate is approximately 85.6%, based on an analysis of over 86,000 surgeries in 2015. Factors influencing follow-up compliance include gender, age, payment status, and surgical technique. Women, individuals younger than 70 years, patients who paid for their surgeries, and those who underwent phacoemulsification showed higher follow-up rates. Conversely, patients with complications, requiring reoperations, or with poorer visual acuity at discharge were less likely to attend. Improving follow-up compliance is crucial for accurate assessment of surgical outcomes and targeting interventions for at-risk patients. The present study seeks to systematically investigate the determinants of non-compliance among patients undergoing free cataract surgeries in India. Prior evidence indicates a significant disparity in follow-up adherence between patients receiving subsidized or free surgical services and those who incur out-of-pocket expenses. This study aims to elucidate the multifactorial barriers, including socioeconomic, cultural, and healthcare system-related factors, that contribute to reduced follow-up rates in this population. By identifying these underlying determinants, the research intends to generate evidence-based recommendations for improving post-operative follow-up adherence and optimizing visual and surgical outcomes in patients availing free cataract services.

METHODS

This study employed a multicenter, retrospective design. Data collection spanned from August to March 2022 and included 15 geographically diverse locations: Bangalore (Karnataka), Chennai (Tamil Nadu), Gaya (Bihar), Brahmapura (Odisha), Raygada (Odisha), Itanagar (Arunachal Pradesh), Rishikesh (Uttarakhand), Jaipur (Rajasthan), Ludhiana (Punjab), Kanpur (Uttar Pradesh), Mandvi (Gujarat), Panvel (Maharashtra), Coimbatore (Tamil Nadu), Nashik (Maharashtra), and Guwahati (Assam). The study period was April 2022 to April 2023.

A structured questionnaire was developed to gather comprehensive data on patient demographics, surgery details, socioeconomic status, perceived barriers to follow-up, and other potential determinants of non-compliance. The questionnaire underwent validation by experts in the field to ensure its relevance and comprehensibility.

Data collection was conducted telephonically to maximize accessibility and minimize logistical challenges, especially for patients in remote or underserved areas. Trained field investigators administered the calls, following a standardized protocol to ensure consistency in data collection. Prior to the interviews, consent was obtained from all participants after explaining the study's purpose and ensuring the confidentiality of their responses. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. All data were anonymized to maintain participant confidentiality.

The study population comprised patients who underwent free cataract surgeries at participating centres during the specified period. Eligibility criteria included adult patients (≥18 years) who were advised to attend a one-month follow-up but failed to do so.

Responses were tabulated and analysed using statistical software. Descriptive statistics were used to summarize patient characteristics, and Chi-square test was applied to identify co-relation demographic data.

RESULTS

The study included a total of 851 patients who underwent cataract surgery. Among them, 432 (51%) were male, and 419 (49%) were female. The age distribution indicated that the majority of patients were aged 65 and above (53%), followed by those aged 50-64 (42%), with only a small proportion (5%) aged 30-49. No patients in the study were younger than 30 years. Education levels among the patients revealed that 68% were illiterate, while 19% had primary schooling, 12% had secondary schooling, and only 1% had completed senior secondary education. No patients reported having higher education qualifications beyond this level. In terms of marital status, the majority of patients were currently married (64%), while 33% were widowed. A small fraction (2%) had never married, and only 0.5% were divorced or separated. Religious representation among the participants showed that 80% identified as Hindu, followed by 11% Sikh, 5% Muslim, and 4% Christian. A negligible percentage (0.5%) belonged to other faiths, while 0.5% declined to state their religious affiliation. Only 34% of the patients reported being engaged in work for a living, whereas 66% were unemployed or not working. Among those working, 13% worked on their farm, 9% were labourers on others' farms, 3% were in private or government jobs, 3% owned a small business or ran a petty shop, and 1% were engaged in construction work. Another 5% reported other occupations. The majority (51%) of patients lived with their children and spouse, while 25% lived with children but without a spouse. Another 13% lived only with their spouse, 7% lived alone, and 4% resided with other relatives.

Table 1: The demographic characteristics of the study population.

		Number	%
Sex	Male	432	51
	Female	419	49
Age (in years)	18-29	0	0
	30-49	45	5
	50-64	357	42
	65+	449	53
Education	Illiterate	576	68
	Primary schooling	163	19
	Secondary schooling	102	12
	Senior secondary schooling	10	1
	Others	0	0
Marital status	Never married	13	2
	Currently married	548	65
	Divorced or separated	4	0
	Widowed/widower	285	33
	Refused to answer	1	0
Religion	Hindu	677	80
	Muslim	43	5
	Christian	33	4
	Sikh	94	11
	Others	2	0
	Refused to answer	2	0
Employment	Yes	291	34
	No	560	66
Type of employment	Works in own farm	111	13
	Labour on other farms	76	9
	Builder/construction worker	10	1
	Private/Government job	29	3
	Petty shop owner/small business	24	3
	Unemployed/not working	560	66
	Other	41	5
Living with	Living with children and spouse	435	51
	Living with children without spouse	214	25
	Living with spouse only	109	13
	Alone	63	7
	Living with relatives	30	4
Eye operated	Left eye	409	48
	Right eye	436	51
	Both eye	6	1
Spectacle use	Yes	71	8
	No	780	92
Type of spectacle	Near	15	21
	Distance	28	39
	Both	28	40
Visual acuity classification in operated eye (Without Pinhole)	Very good 6/6-6/12	458	53
	Good < 6/12-6/18	194	23
	Borderline <6/18-6/60	115	13
	Poor <6/60	90	11
Visual acuity classification in operated eye (With Pinhole)	Very good 6/6-6/12	675	79
	Good < 6/12-6/18	78	9
	Borderline <6/18-6/60	58	7
	Poor <6/60	46	5

Table 2: Treatment sought for eye complaints by study population.

Companion for the surgery	**Self**	**630**	**74**
	Husband/wife	68	8
	Children	108	13
	Other family member	23	3
	Other	22	3
Last visited hospital for	First eye cataract surgery	541	64
	Second eye cataract surgery	310	36
One month follow up review was conducted at	Camp	506	60
	Vision centre	11	1
	Base hospital	319	37
	Other location	15	2
Decision maker for medical treatment or hospital visit	Self	520	62
	Spouse	98	12
	Parents	4	0
	Children	216	25
	Relatives	10	1
	Friend	1	0
	Refuse to answer	2	0
Complaints/problems in the operated eye	Watering	54	6
	Itching	17	2
	Redness	2	0
	Pain	31	4
	Poor/hazy vision	54	6
	No complaints/problems	693	82
Treatment for eye problems / complaints after surgery	Yes	41	26
	No	116	73
	Refuse to answer	1	1
If yes, place visited to treat eye problem/complaint after surgery	Vision centre	1	2
	Government hospital	5	12
	Private doctor or hospital	14	34
	Base hospital	18	44
	Traditional healer	0	0
	Pharmacists/medical shop	2	5
	Optical shop	1	2
	Village doctor	0	0
Got relief from the eye complaint	Yes fully	12	29
	Yes, partially	16	39
	No	13	32
	Can't say	0	0
Satisfied with the outcome cataract surgery	Yes	822	97
	No	29	3

Regarding the operated eye, 48% of surgeries were performed on the left eye, 51% on the right eye, and 1% underwent surgery on both eyes. Post-surgery spectacle use was relatively low, with only 8% of patients using spectacles, while 92% did not. Among spectacle users, 21% required spectacles for near vision, 39% for distance vision, and another 39% for both.

Without pinhole correction, 53% of operated eyes had very good visual acuity (6/6-6/12), 23% had good acuity (<6/12-6/18), 13% had borderline acuity (<6/18-6/60), and 11% had poor acuity (<6/60). With pinhole correction, outcomes improved significantly, with 79% achieving very good acuity, 9% good acuity, 7% borderline acuity, and only 5% remaining in the poor acuity category. A majority (74%) of patients attended the surgery independently, while 13% were accompanied by their children, 8% by their spouse, 3% by other family members, and another 3% by others.

Of the total patients, 64% had undergone surgery for their first eye, while 36% underwent a second-eye cataract surgery. One-month follow-up visits were conducted at

various locations: 59% of patients were reviewed at camps, 37% at base hospitals, 1% at vision centres, and 2% at other locations. When asked about decision-making regarding medical treatment, 61% of patients made their own decisions, 25% relied on their children, 12% depended on their spouse, and smaller proportions relied on relatives (1%) or parents (0.5%).

Table 3: Post operative follow-up data of the study population.

		Number	%
Received any information on post-operative follow-up schedule	Yes	712	84
	No	118	14
	Do not remember	21	2
Think it is important to attend the review after surgery	Yes	838	98
	No	13	2
Reason for not attending for one-month final post operative review	Need not felt the need for follow-up visits	6	1
	Can see better with the operated eye now	68	8
	Fear/afraid of eye care procedure	3	0
	Attitude of the health care providers at the hospital	1	0
	Friends/neighbours advised against the visit	16	2
	Forgot about the follow-up visits	169	20
	Had to care for someone sick at home	35	4
	Busy with my usual work at home	53	6
	Busy with livelihood activity	44	5
	Had other personal commitments elsewhere	39	5
	Unwilling to travel due to bad roads	1	0
	Was worried about the medical costs involved	7	1
	Could not afford the local transport	35	4
	Place of review was located very far	7	1
	No escort/attendant to accompany	68	8
	Was sick/poor health condition	81	10
	Did not have any information on follow-up visits	75	9
	Difficult terrain from house to review location	1	0
	Review visit timing did not suit me	5	1
	Longer waiting times for review check-up	4	0
	Lack of proper transportation facilities (buses, autos, trains)	10	1
	My friend did not visit so I also did not go for follow up	6	1
	Other	117	14
Willing to visit the hospital/camp/vision centre for final follow-up review visit	Yes	664	78
	No	187	22
If yes, where	Hospital	248	37
	Camp	369	56
	Vision centre	47	7
If yes, need any support to attend the follow-up review visit soon	Yes	253	38
	No	411	62
If yes, please specify the support needed	Address of review centre	32	13
	Escort to come along	32	13
	Transportation support	161	63
	Other support	28	11

Most patients (81%) reported no post-surgical complaints. However, 6% reported watering, 6% poor or hazy vision, 4% pain, 2% itching, and 0.5% redness. Among 158 patients who experienced post-surgical complaints, 26% sought treatment, while 73% did not. The most common places visited for treatment were base hospitals (44%), private doctors or hospitals (34%), and government hospitals (12%). Only a few sought care at pharmacists (5%), vision centres (2%), or optical shops (2%). Patient satisfaction was very high, with 97% expressing satisfaction, while 3% were not satisfied. No patients

reported partial satisfaction. The majority (84%) of patients reported receiving information about their post-operative follow-up schedule, while 14% did not, and 2% could not recall receiving such information.

Table 4: Chi-square test depicts the goodness of fit with one month follow up.

Variable comparison	Chi-Square (χ^2) value	P value	Significance
Gender vs. Spectacle use	0.77	0.38	Not significant
Age vs. Satisfaction	82.86	<0.0001	Strong significant association
Education vs. Follow-up	0.14	0.99	Not significant
Religion vs. Complaints	3.32	0.51	Not significant

A significant 98% of patients recognized the importance of follow-up visits, while only 2% believed it was not necessary. Among the patients who did not attend their one-month post-operative review, reasons included forgetting about the appointment (20%), engaging in usual work at home (6%), being busy with livelihood activities (5%), personal commitments (5%), caring for a sick person at home (4%), financial constraints (1%), and poor transportation facilities (1%). Some patients (8%) cited a lack of an escort or attendant, while others did not feel the need for a review (1%). Additionally, 10% missed follow-ups due to their own poor health condition. When asked about their willingness to attend a follow-up review, 78% of patients agreed, while 22% were unwilling. Among those willing, 56% preferred to visit a camp, 37% a hospital, and 7% a vision centre.

Among those willing to visit for a final follow-up, 38% required support, while 62% did not. Of those needing support, 62% required transportation, 13% an attendant, 13% wanted address of the review location and 11% needed other types of support.

The chi-square test results revealed a significant association between age and satisfaction with cataract surgery (χ^2=82.86, p<0.0001), suggesting that older individuals were more satisfied, possibly due to lower expectations and greater perceived improvement. However, no significant associations were found between gender and spectacle use (χ^2=0.77, p=0.38), education and follow-up adherence (χ^2=0.14, p=0.99), or religion and post-operative complaints (χ^2=3.32, p=0.51). These findings suggest that demographic factors like gender, education, and religion do not significantly impact post-surgical adherence or experiences, while age-related differences in satisfaction highlight the need for managing expectations among younger patients. This underscores the importance of personalized patient education and follow-up care to enhance overall post-operative outcomes.

DISCUSSION

Our study found that the majority of patients were aged 65 and above (53%), with a significant proportion being illiterate (68%) and unemployed (66%). This aligns with previous studies conducted in developing countries, which have also reported a high prevalence of cataracts among the elderly and economically disadvantaged populations.[17] However, compared to studies in high-income countries where literacy and employment rates among cataract patients are higher, our findings suggest a need for targeted awareness campaigns and financial support mechanisms to improve cataract surgery uptake.

The post-operative visual acuity outcomes in our study indicate that 79% of patients achieved good visual acuity (6/6–6/12) with pinhole correction, while 5% had poor visual acuity (<6/60). These findings are consistent with previous studies in South Asia, which reported post-surgical visual improvement rates of around 75-80% with good acuity.[19] In contrast, studies in Western countries have shown even better outcomes, with 90-95% of patients achieving good visual acuity post-surgery.[14] This discrepancy could be attributed to variations in surgical techniques, post-operative care, and follow-up compliance. Only 8% of patients in our study reported using spectacles post-surgery, which is considerably lower than findings from studies conducted in urban centres, where spectacle adoption rates are higher. The low rate in our study may be due to a lack of awareness, affordability issues, or reluctance to use corrective eyewear. Efforts to educate patients on the benefits of spectacle use post-surgery could improve long-term visual outcomes.

Patient satisfaction was very high (97%), which is consistent with prior research showing that cataract surgery is generally well-received due to significant improvements in quality of life.[20] However, 19% of patients reported post-surgical complaints, such as watering (6%) and poor vision (6%). This is slightly higher than the 10-15% reported in similar studies, possibly due to differences in surgical methods or follow-up adherence.[26] A major challenge identified in our study was follow-up compliance, with reasons for missed follow-ups including forgetfulness (20%), personal commitments (5%), and financial constraints (1%). This aligns with findings from studies in rural India and Africa, where logistical and economic barriers are significant deterrents to follow-up visits.[19] The high willingness to attend follow-ups (78%) suggests that

targeted interventions, such as reminder calls, transportation assistance, and community-based follow-up programs, could improve compliance.

Our findings emphasize the need for comprehensive patient education, improved post-surgical care and strengthened follow-up mechanisms. Future studies should explore the impact of interventions such as mobile health solutions, community-based vision screening programs, and financial aid for post-surgical care. Additionally, comparative studies assessing surgical outcomes across different healthcare settings would provide further insights into optimizing cataract management strategies.

Limitations

Recall bias may have affected the findings, particularly as some participants were of advanced age. Additionally, the study included only those individuals who could be contacted, potentially excluding the most marginalized and hard-to-reach populations. However, a key strength of the study lies in its inclusion of participants from diverse regions across the country, offering a wider and more representative perspective

CONCLUSION

Overall, our study highlights the success of cataract surgery in restoring vision while also identifying areas for improvement, particularly in follow-up adherence and post-surgical care. While outcomes are generally favourable, there are disparities in access to care, follow-up compliance, and spectacle use that need to be addressed. Strengthening healthcare infrastructure, implementing patient-centred interventions, and conducting further research will help bridge these gaps and improve long-term visual outcomes for cataract patients.

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