



Original Article

BARRIERS TO CATARACT SURGERY UPTAKE AMONG PATIENTS WITH OPERABLE CATARACT ATTENDING A TERTIARY CARE CENTRE IN SOUTH RAJASTHAN: A CROSS-SECTIONAL STUDY

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ABSTRACT

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Background: Cataract is the leading cause of avoidable blindness worldwide, particularly in low- and middle-income countries like India. Despite the availability of effective surgical treatment under national programs, uptake of cataract surgery remains suboptimal due to various barriers, especially in rural and socioeconomically disadvantaged populations.

Objectives: To assess the barriers to cataract surgery uptake among patients with operable cataract attending a tertiary care centre in South Rajasthan and to identify factors associated with non-uptake.

Methods: A hospital-based cross-sectional study was conducted in the Department of Ophthalmology at a tertiary care centre in South Rajasthan from July to December 2025. A total of 235 patients aged ≥ 40 years with operable cataract were included using consecutive sampling. Data were collected using a pre-designed, semi-structured questionnaire covering socio-demographic details, clinical profile, awareness, and perceived barriers. Statistical analysis was performed using SPSS version 25. Descriptive statistics were used to summarize data, and Chi-square test was applied to assess associations. Logistic regression analysis was conducted to identify independent predictors of non-uptake. A p-value < 0.05 was considered statistically significant.

Results: The majority of participants were aged 60–69 years, with a predominance of rural residents and individuals from lower socioeconomic strata. Although 78.7% were aware that cataract is treatable, only 61.7% perceived the need for surgery. Overall, 61.7% of participants were willing to undergo cataract surgery. The most common barriers identified were cost concerns (46.8%), fear of surgery (41.3%), and distance to healthcare facility (38.7%). Significant associations were found between willingness for surgery and residence, education, and socioeconomic status ($p < 0.05$). Logistic regression analysis revealed that illiteracy, rural residence, cost concerns, and fear of surgery were significant predictors of non-uptake.

Conclusion: Barriers to cataract surgery uptake are multifactorial, with economic, personal, and accessibility factors playing a major role. Targeted interventions focusing on awareness, financial support, accessibility, and patient counseling are essential to improve surgical uptake and reduce avoidable blindness.

Keywords: Cataract; Surgery Uptake; Barriers; Rural Population; Visual Impairment; South Rajasthan; Cross-Sectional Study.

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INTRODUCTION

Cataract remains the leading cause of reversible blindness worldwide and accounts for a substantial proportion of avoidable visual impairment, particularly in low- and middle-income countries [1]. It is estimated that millions of individuals, particularly in low- and middle-income countries, continue to suffer from visual impairment due to untreated cataract [2].

Cataract surgery is recognized as one of the most cost-effective healthcare interventions, significantly improving visual outcomes, quality of life, and socioeconomic productivity [3]. However, a substantial gap persists between those requiring surgery and those who actually undergo it, commonly referred to as the “cataract surgical coverage gap” [4].

India has made considerable progress in addressing cataract-related blindness through the implementation of the National Programme for Control of Blindness and Visual Impairment (NPCBVI), which focuses on early detection, free or subsidized surgical services, and outreach activities [5]. Despite these efforts, the uptake of cataract surgery remains suboptimal in several parts of the country, particularly among rural and socioeconomically disadvantaged populations [6]. Regions such as South Rajasthan, characterized by a predominantly rural and tribal population, face unique challenges including limited healthcare access, lower literacy levels, and socio-cultural barriers that influence health-seeking behavior. South Rajasthan comprises a large rural and tribal population with limited accessibility to specialized ophthalmic services. Factors such as poor transportation facilities, lower literacy levels, socioeconomic dependency, and delayed health-seeking behaviour may further contribute to poor uptake of cataract surgery in this region.

Barriers to cataract surgery uptake are multifactorial and often interrelated. Personal factors such as fear of surgery, lack of perceived need, and misconceptions regarding surgical outcomes have been consistently reported across various studies [7]. Economic constraints also play a critical role, including direct costs of treatment as well as indirect costs such as transportation and loss of daily wages [8]. These financial barriers are particularly significant among economically weaker sections, leading to delays in seeking timely surgical care.

Accessibility-related issues further compound the problem, especially in geographically remote areas. Long distances to healthcare facilities, poor transportation infrastructure, and dependency on others for mobility can significantly hinder access to surgical services [9]. In addition, health system-related factors such as long waiting times, perceived poor quality of care, and lack of trust in healthcare providers may discourage patients from opting for surgery.

Social and cultural determinants also influence decision-making regarding cataract surgery. Gender disparities, lack of family support, and dependence on family members for healthcare decisions have been shown to delay or prevent surgical uptake, particularly among women and elderly individuals [10]. Furthermore, inadequate awareness regarding the treatability of cataract and availability of free surgical services continues to be a major barrier, especially among illiterate populations.

Although several studies have evaluated barriers to cataract surgery uptake in different regions of India, limited data are available from South Rajasthan, especially from tertiary care settings catering to tribal and rural populations. Region-specific evidence is essential for planning targeted public health interventions and improving cataract surgical coverage.

In this context, the present study was conducted in the Department of Ophthalmology at a tertiary care centre in South Rajasthan to assess the barriers to cataract surgery uptake among patients diagnosed with operable cataract. The findings of this study are expected to provide valuable insights into socio-demographic, economic, and healthcare-related factors influencing surgical acceptance and help in formulating strategies to reduce avoidable blindness due to cataract.

MATERIALS AND METHODS

Study Design: This study was a hospital-based cross-sectional study.

Study Setting: The study was conducted in the Department of Ophthalmology at a tertiary care centre in South Rajasthan, which serves as a referral centre for both rural and urban populations, including tribal areas.

Study Period: The study was carried out over a period of six months from July 2025 to December 2025.

Study Population: The study population included patients attending the Ophthalmology outpatient department (OPD) who were diagnosed with operable cataract but had not yet undergone cataract surgery.

Inclusion Criteria

- Patients aged ≥ 40 years
- Diagnosed with operable cataract by an ophthalmologist
- Patients who had not undergone cataract surgery
- Patients who were willing to participate and provided informed consent

Exclusion Criteria

- Patients with previous cataract surgery
- Cases of traumatic or complicated cataract
- Patients who were seriously ill or unable to respond to the questionnaire
- Patients unwilling to give consent

Sample Size: A total of 235 participants were included in the study. All eligible patients attending the OPD during the study period were recruited until the desired sample size was achieved.

Sampling Technique: A non-probability consecutive sampling technique was employed, wherein all eligible patients meeting the inclusion criteria were included in the study during the study period.

Study Tool: Data were collected using a pre-designed, pre-tested, semi-structured questionnaire, which included the following sections:

- Socio-demographic details (age, gender, residence, education, occupation, socioeconomic status)
- Clinical details related to cataract
- Awareness and perception regarding cataract and its treatment
- Barriers to cataract surgery uptake

The questionnaire was adapted from previously published studies assessing barriers to cataract surgery uptake in India and was modified according to local study requirements.

Operational Definitions

- **Operable cataract:** Cataract causing visual impairment significant enough to warrant surgical intervention as assessed by an ophthalmologist.
- **Uptake of cataract surgery:** Willingness or acceptance of the patient to undergo cataract surgery after diagnosis.
- **Barriers:** Factors preventing or delaying the patient from undergoing cataract surgery.

Variables Studied

Dependent Variable

- Uptake of cataract surgery (willing/not willing)

Independent Variables

- Socio-demographic factors
- Clinical characteristics
- Awareness regarding cataract
- Identified barriers (personal, economic, accessibility, health system, and social)

Data Collection Procedure: Eligible patients were identified during their visit to the Ophthalmology OPD. After obtaining informed consent, participants were interviewed using the structured questionnaire. Clinical details were confirmed from patient records and examination findings. Privacy and confidentiality were ensured throughout the data collection process.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were applied to summarize the data, including calculation of frequencies, percentages, mean, and standard deviation. Inferential statistics were performed using the Chi-square test to assess the association between categorical variables. Multivariate analysis was carried out using logistic regression to identify independent predictors of non-uptake of cataract surgery. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: Informed written consent was obtained from all participants prior to their inclusion in the study. Confidentiality and anonymity of the participants were strictly maintained throughout the study. The study was carried out in accordance with the ethical principles outlined in the Declaration of Helsinki.

RESULTS

A total of 235 participants diagnosed with operable cataract were included in the study. The majority belonged to older age groups, with a predominance of rural residents and individuals from lower socioeconomic strata. Table 1 shows the socio-demographic profile of the study participants. The largest proportion (32.8%) belonged to the 60–69 years age group. Males constituted 53.6% of the study population. A majority of participants were from rural areas (66.8%) and nearly half (46.4%) were illiterate.

Table 1: Socio-Demographic Profile of Participants (n = 235)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	40–49	36	15.3
	50–59	64	27.2
	60–69	77	32.8
	≥70	58	24.7

Gender	Male	126	53.6
	Female	109	46.4
Residence	Rural	157	66.8
	Urban	78	33.2
Education	Illiterate	109	46.4
	Primary	68	28.9
	Secondary & above	58	24.7
Socioeconomic Status	Lower	129	54.9
	Middle	84	35.7
	Upper	22	9.4

As shown in Table 2, bilateral cataract was present in 57.4% of participants. Most patients (43.4%) reported symptoms for 1–3 years. Moderate to severe visual impairment was seen in the majority.

Table 2: Clinical Characteristics of Participants (n = 235)

Variable	Category	Frequency (n)	Percentage (%)
Type of Cataract	Unilateral	100	42.6
	Bilateral	135	57.4
Duration of Symptoms	<1 year	70	29.8
	1–3 years	102	43.4
	>3 years	63	26.8
Visual Impairment	Mild	45	19.1
	Moderate	104	44.3
	Severe	86	36.6
Comorbidities	Present	94	40.0
	Absent	141	60.0

Table 3 depicts awareness regarding cataract. While 78.7% were aware that cataract is treatable, only 61.7% perceived the need for surgery.

Table 3: Awareness and Perception Regarding Cataract Surgery (n = 235)

Variable	Category	Frequency (n)	Percentage (%)
Aware cataract is treatable	Yes	185	78.7
	No	50	21.3
Aware of surgery	Yes	172	73.2
	No	63	26.8
Perceived need for surgery	Yes	145	61.7
	No	90	38.3
Source of Information	Health worker	70	29.8
	Family/Friends	80	34.0
	Media	30	12.8
	Others	55	23.4

Multiple barriers were identified (Table 4). The most common barrier was cost of surgery (46.8%), followed by fear of surgery (41.3%) and distance to healthcare facility (38.7%).

Table 4: Distribution of Barriers to Cataract Surgery Uptake (n = 235)

(Multiple responses allowed)

Barrier Type	Specific Barrier	Frequency (n)	Percentage (%)
Personal	Fear of surgery	97	41.3
	No felt need	84	35.7

Economic	Cost concerns	110	46.8
	Loss of wages	72	30.6
Accessibility	Distance	91	38.7
	Transport issues	79	33.6
Health System	Long waiting time	64	27.2
	Lack of trust	39	16.6
Social	Lack of family support	68	28.9
	Gender bias	36	15.3

Out of 235 participants, 145 (61.7%) were willing to undergo cataract surgery. Table 5 shows significant associations with residence, education, and socioeconomic status. Gender was not significantly associated with willingness for surgery ($p > 0.05$).

Table 5: Association Between Willingness for Surgery and Socio-Demographic Variables (n = 235)

Variable	Category	Willing (n=145)	Not Willing (n=90)	χ^2	p-value
Gender	Male	82	44	1.02	0.312
	Female	63	46		
Residence	Rural	89	68	4.41	0.036*
	Urban	56	22		
Education	Illiterate	58	51	5.55	0.018*
	Literate	87	39		
SES	Lower	70	59	6.02	0.014*
	Middle/Upper	75	31		

*Statistically significant

On logistic regression analysis (Table 6), cost concerns, fear of surgery, and illiteracy were found to be significant predictors of non-uptake.

Table 6: Logistic Regression Analysis for Predictors of Non-Uptake

Variable	Adjusted Odds Ratio (AOR)	95% CI	p-value
Illiteracy	2.18	1.24–3.82	0.006*
Rural residence	1.74	1.01–3.01	0.045*
Cost barrier	2.51	1.46–4.30	0.001*
Fear of surgery	1.97	1.14–3.41	0.015*
Lack of awareness	1.42	0.82–2.46	0.201

*Statistically significant

Participants with cost-related concerns had nearly 2.5 times higher odds of refusing cataract surgery compared to those without such concerns.

DISCUSSION

The present hospital-based cross-sectional study conducted in the Department of Ophthalmology at a tertiary care centre in South Rajasthan assessed barriers to cataract surgery uptake among 235 patients with operable cataract. The findings highlight that despite reasonable awareness, multiple socio-demographic, economic, and health system-related barriers continue to influence surgical acceptance.

In the present study, the majority of participants belonged to the elderly age group, particularly 60–69 years. This is consistent with the known epidemiology of cataract as an age-related condition, as reported in previous studies [2,6]. A predominance of rural participants and individuals from lower socioeconomic strata was observed. Similar findings have been reported by Marmamula et al. [4] and Nirmalan et al. [11], highlighting limited utilization of eye care services among rural populations. Similar barriers have also been observed in studies conducted in rural North India, where financial dependency, lack of awareness, and accessibility-related issues significantly affected cataract surgical uptake.

Although awareness regarding cataract was relatively high in the present study, only 61.7% of participants perceived the need for surgery. This gap between awareness and uptake has been reported in earlier studies [6,8]. Fletcher et al. [12] also emphasized that lack of perceived need remains a major reason for delayed surgical intervention.

Economic barriers were the most commonly reported obstacle in this study. Despite availability of free or subsidized surgical services, indirect costs such as transportation and wage loss continue to influence decision-making. Similar findings have been reported in earlier studies [7,8,13], where financial constraints were identified as a major barrier. Fear of surgery was another important personal barrier identified in this study. This finding is consistent with studies by Rabiou [1] and Dhaliwal et al. [13], where fear and misconceptions were common reasons for refusal of cataract surgery.

Accessibility-related barriers such as distance and transport issues were also prominent. These findings are comparable with those reported by Amritanand et al. [9] and Nirmalan et al. [11], emphasizing the role of geographic inaccessibility in rural populations.

Social factors such as lack of family support and gender-related issues also influenced uptake. Although gender was not statistically significant in the present study, women showed relatively lower willingness for surgery. Similar findings have been reported in previous studies [10,14], where sociocultural dependency and gender bias played an important role.

The overall willingness for cataract surgery in this study was moderate, comparable to other Indian studies [6,8]. Logistic regression analysis identified illiteracy, rural residence, cost concerns, and fear of surgery as significant predictors of non-uptake. These findings are consistent with earlier research [4,7,13], reinforcing the importance of socio-economic and educational determinants.

Overall, the findings of this study are consistent with existing literature, demonstrating that barriers to cataract surgery uptake are multifactorial. While availability of services has improved, demand-side barriers remain significant. Addressing these through targeted interventions such as awareness campaigns, financial support, improved accessibility, and effective counseling is essential to enhance cataract surgical uptake in regions like South Rajasthan.

The present study has certain limitations. Being a hospital-based cross-sectional study, the findings may not be fully generalizable to the entire community population. Responses regarding barriers were self-reported and may be subject to recall or response bias. In addition, causal relationships could not be established due to the cross-sectional study design.

Despite these limitations, the study provides important region-specific data regarding barriers to cataract surgery uptake among rural and tribal populations in South Rajasthan and highlights important modifiable determinants that can guide public health interventions.

CONCLUSION

The study concludes that barriers to cataract surgery uptake in South Rajasthan are multifactorial, predominantly involving economic constraints, fear of surgery, poor accessibility, and inadequate awareness. Illiteracy and rural residence were significant predictors of non-uptake. Strengthening outreach services, improving patient counselling, and reducing indirect treatment costs may substantially improve cataract surgical uptake and help reduce avoidable blindness in the region.

DECLARATIONS

Availability of Data and Materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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Authors' Contributions: All authors contributed to the study conception, design, data collection, analysis, and manuscript preparation. All authors have read and approved the final manuscript.

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