

Original Research Article

Impact of cataract surgery on quality of life in rural areas of Jharkhand: a community based cross-sectional study

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ABSTRACT

Background: Cataract is the leading cause of blindness in India, accounting for approximately 66.2% of all blindness cases and accounting for 71.2% of all visual impairment cases. This study was conducted in 5 blocks of East Singhbhum and Saraikela-Kharsawan districts of Jharkhand to determine burden of cataract and the impact of cataract surgery on quality of life in the rural population.

Methods: Community based cross sectional study was conducted between January 2023 to April 2023 among individuals residing in rural areas of Jharkhand using multi-stage sampling with a sample size of 692 individuals.

Results: Prevalence of cataract amongst the study population was 23% (159) and there was a statistically significant improvement in the quality-of-life post cataract surgery.

Conclusions: High prevalence of cataract increases the burden on existing health care system. Ongoing research and initiatives should focus on improving early detection and referral, providing comprehensive post-operative care to reduce the burden of cataract and improve the quality-of-life outcomes among the individuals.

Keywords: Cataract, Quality-of-life, Preventable blindness, Rural health

INTRODUCTION

Cataract is a prevalent ocular condition characterized by the clouding of the lens, which adversely affects visual acuity. It is widely recognized as the leading cause of blindness and visual impairment, predominantly associated with the natural process of aging. Although cataracts primarily affect older individuals, it is important to note that there are cases where infants are born with this condition and it can also develop as a consequence of eye injuries, inflammation or other underlying diseases such as glaucoma and diabetes. In certain instances, cataract formation has been linked to the use of steroids or exposure to specific types of radiation. Given the increasing longevity of individuals worldwide, it is anticipated that the prevalence of cataract cases will continue to rise. Notably, cataract is a significant contributor to reduced visual acuity. Regrettably, there is

currently no known method of preventing cataracts. However, it has been observed that minimizing cigarette smoking and reducing exposure to ultraviolet light may potentially delay the onset and progression of cataracts.¹

The approach to cataract treatment is tailored to the extent of visual impairment experienced by the individual. If the impact of a cataract on vision is minimal or negligible, treatment may not be necessary. Patients may be advised to monitor any potential increase in visual symptoms and adhere to a regular check-up schedule.

In certain cases, a temporary improvement in vision can be achieved by adjusting the prescription of eyeglasses. When a cataract progresses to the point where it interferes with the individual's ability to carry out everyday tasks, surgical intervention becomes necessary. Cataract surgery involves the extraction of the clouded lens and its

replacement with an artificial lens. These artificial lenses require no special care and can significantly enhance vision.² Vision impairment carries a substantial economic burden on a global scale, with an estimated annual cost of productivity losses associated with vision impairment reaching a staggering US\$ 411 billion. The primary causes of vision impairment and blindness are uncorrected refractive errors and cataracts.

While the majority of individuals affected by vision impairment and blindness are over the age of 50, it is important to recognize that vision loss can affect individuals of all age groups. Currently, there are at least 2.2 billion people globally who experience either near or distance vision impairment. Alarming, in almost half of these cases, the vision impairment could have been prevented or has yet to be addressed.

The impact of vision impairment extends to various aspects of life. Among adults, vision impairment significantly affects quality of life. Adults with vision impairment often face lower rates of workforce participation and productivity, along with higher rates of depression and anxiety. For older adults, vision impairment can contribute to social isolation, difficulty walking, an increased risk of falls and fractures and a greater likelihood of early admission into nursing homes or care facilities.

From an economic standpoint, vision impairment imposes a tremendous financial burden worldwide. The estimated annual global productivity loss of approximately US\$ 411 billion far exceeds the estimated cost required to address the unmet needs related to vision impairment, which is estimated to be around US\$ 25 billion.³

Cataract is the leading cause of blindness in India, accounting for approximately 66.2% of all blindness cases and accounting for 71.2% of all visual impairment cases.⁴ The burden of cataract is not evenly distributed across different regions of India. Rural areas tend to have a higher prevalence of cataract and lower access to eye care services compared to urban areas. Factors such as lack of awareness, limited access to healthcare facilities, poverty, and inadequate infrastructure contribute to the cataract burden in India. Cataract surgeries are the most common surgical procedure performed in India. The government and various organizations have implemented programs to increase the availability and accessibility of cataract surgeries, particularly for underprivileged populations. Present study was conducted in 5 blocks of East Singhbhum and Saraikela-Kharsawan districts of Jharkhand as a part of ongoing research and initiatives that focus on improving early detection, strengthening referral mechanism and providing comprehensive operative/postoperative care to reduce the burden of cataract and to improve the quality-of-life outcomes in Jharkhand.

Aims of this study were to determine the prevalence of Cataract amongst individuals of rural Jharkhand, to determine the impact of cataract surgery on quality of life amongst individuals with cataract of rural Jharkhand, and to describe the sociodemographic profile of study population.

METHODS

A cross sectional study was conducted between January 2023 to April 2023 amongst individuals residing in rural areas of East Singhbhum and Saraikela-Kharsawan districts with sample size of 692 individuals (minimum required: 237, based on $4PQ/D^2$, $p=62.8\%$).⁵ Multistage sampling was used to select sample wherein at first stage stratified random sampling with sampling ratio using PPS (probability proportional to size) was used to select blocks and in stage 2, convenient sampling was used for selecting villages within a block. Individuals who were 18 years and above, permanent residents (>6 months) and who gave informed consent were included in the study. Cataract cases who were detected during screening and who were fit for surgery were taken up for free cataract surgeries. A semi structured questionnaire was used for data collection and analysis was done using descriptive statistics like frequency, proportion, mean, standard deviation, inferential statistics like chi-square test, paired t test, logistic regression analysis were used.

Operational definitions

Cataract: Cataract is a clouding or opacification of the normally clear lens of the eye or its capsule (surrounding transparent membrane) that obscures the passage of light through the lens to the retina of the eye.

RESULTS

In the present study among 692 individuals, 397 were females and 295 were males. Mean age of the study population was 53.58 ± 13.623 years (Table 1).

Table 1: Sociodemographic details of the study population (n=692).

Factor	Frequency	Percentage
Gender		
Male	295	42.6
Female	397	57.4
Block name		
Chandil	105	15.2
Gamharia	85	12.3
Golmuri-cum-Jugsalai	110	15.9
Patamda	188	27.2
Boram	204	29.5

Table 2: Risk factors for the development of cataract (n=692).

Factor	Frequency	Percentage
Diabetes mellitus		
No	644	93.1
Yes	48	6.9
Hypertension		
No	591	85.4
Yes	101	14.6
Tobacco use		
No	336	48.6
Smokeless	187	27.0
Smoking	128	18.5
Both	41	5.9
Alcohol use		
No	514	74.3
Yes	178	25.7
History of injury/trauma to the eye		
No	679	98.1
Yes	13	1.9
Use of corticosteroids		
No	680	98.3
Yes	12	1.7

Table 3: Differential diagnosis of screening activity (n=692).

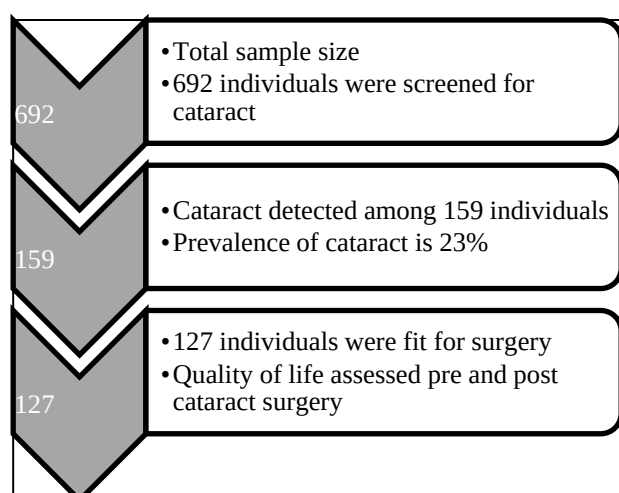
Factor	Frequency	Percentage
Normal	187	27.0
Cataract detected	159	23.0
Refractive error	317	45.8
Previous surgical complication	3	0.4
Others	25	3.6

Table 4: Logistic regression analysis to determine the association between risk factors and development of cataract (n=692).

Variables	Category	Cataract		B	p value	OR	95% CI	
		No	Yes				Lower	Upper
Gender	Female	304	93	-0.469	0.024	0.625	0.416	0.940
	Male	229	66					
Diabetes	No	498	146	0.117	0.758	1.124	0.536	2.357
	Yes	35	13					
Hypertension	No	461	130	0.228	0.394	1.255	0.744	2.118
	Yes	72	29					
Tobacco use	No	284	52	1.025	0.000	2.788	1.799	4.322
	Yes	249	107					
Alcohol use	No	405	109	0.050	0.828	1.051	0.670	1.649
	Yes	128	50					
History of trauma	No	522	157	-0.692	0.378	0.501	0.107	2.334
	Yes	11	2					
Corticosteroid use	No	525	155	0.637	0.332	1.892	0.521	6.862
	Yes	8	4					

Table 5: Quality of life before and after the cataract surgery (n=127).

Questions	Mean scores before cataract surgery	Mean scores after cataract surgery	t	p value
Overall, how would you rate your eyesight using both eyes – with glasses or contact lenses if you wear them?	1.8 (1.8268±0.50544)	4.6 (4.6378±0.48254)	43.949	<0.01
How much pain or discomfort do you have in your eyes (e.g., burning, itching, aching)?	4.8 (4.8346±0.39368)	4.5 (4.4803±0.67671)	5.736	<0.01
Because of your eyesight, how much difficulty do you have in going down steps or stairs?	4.9 (4.8583±0.37213)	3.2 (3.1969±1.06934)	16.389	<0.01
Because of your eyesight, how much difficulty do you have in searching for something on a crowded shelf?	3.9 (3.8976±1.02998)	1.0 (1.0236±0.15247)	31.409	<0.01
Because of your eyesight, how much difficulty do you have in recognizing the face of a person standing near you? (e.g., family members)	3.7 (3.7087±1.03211)	1.0 (1.0157±0.12499)	28.484	<0.01
Because of your eyesight, how often have you been hesitant to participate in social functions?	2.5 (2.5276±0.76456)	1.1 (1.1575±0.46163)	17.027	<0.01
How much difficulty do you have in seeing close objects (e.g., making out differences in coins or notes)?	2.5 (2.5039±1.11180)	1.0 (1.0236±0.15247)	14.726	<0.01
Because of your eyesight, how often have you felt that you are a burden on others?	2.5 (2.4567±1.11808)	1.0 (1.0079±0.08874)	14.425	<0.01

**Figure 1: Selection of sample at various stages of the study.**

Among the study population 6.9% were diabetic and 14.6% were hypertensive. Consumption of tobacco in some form among the study subjects was 51% and 25.7% gave history of regular alcohol consumption. About 1.9% had a previous history of trauma to the eye and 1.7% were using corticosteroid medications (Table 2).

Among the individuals who were screened for cataract, 23% had cataract, 45.8% had refractive error, 3.6% had other eye ailments such as conjunctivitis, pterygium etc. (Table 3).

Logistic regression was used to determine the association of various independent risk factors in the development of

cataract. Risk factors such as Gender and Tobacco use were significantly associated with development of cataract (Table 4). Hosmer and Lemeshow test showed a Chi-square value of 4.967 with the p value of 0.664.

As shown in the Figure 1, among the sample of 692 individuals, cataract was detected among 159 individuals and among them 127 were fit to undergo cataract surgery.

Impact of cataract surgeries on quality of life showed significant improvement in quality of various aspects of life (Table 5).

DISCUSSION

Tata Steel Foundation has been implementing public health activities and supporting various national health programmes in Jharkhand. The communities have significantly benefitted from TSF's work in Jharkhand, especially in rural and difficult to reach areas. Preventable blindness program is one such program where the most vulnerable and rural population of Jharkhand are screened for cataract in the communities and are provided cataract surgery services free of cost. There are two types of modalities in which the cataract surgeries are held.

Facility based: The vulnerable and eligible patients are screened in public health outreach sessions in remote villages. Cataract patients are taken to hospitals for surgery. The operated patients sent back to their villages after surgery. Post-operative check-ups are held after 1 week and after 28 days as per operating guidelines.

Outreach based: The vulnerable and hard to reach individuals who are in remote areas are screened and operated in the community using mobile eye surgical unit. The mobile unit remains stationed in the camp venue for a period of 10 days. Post-operative check-ups are held after 1 week and after 28 days as per operating guidelines

TSF has successfully restored vision of more than 30,000 patients in last ten years through free cataract surgeries.

Present study shows a statistically significant association between tobacco use and development of cataract which is similar to study conducted by Raju et al, in rural South India in which tobacco use was significantly associated with cataract and smoking was not found to be significantly associated with cataract formation; however, smokeless tobacco use was more strongly associated with cataract.⁶ India has one of the highest rates of tobacco use globally, with a substantial number of people engaging in both smoking and smokeless tobacco consumption. The habit is prevalent across various age groups and socioeconomic backgrounds, further contributing to the burden of tobacco-related cataract cases. Tobacco use significantly contributes to the overall burden of cataract in India. The combination of high tobacco prevalence and the large population size in the country translates into a substantial number of cataract cases attributable to tobacco use. This poses a considerable challenge for public health efforts aimed at reducing visual impairment and blindness related to cataract. India has implemented several tobacco control measures, including legislation, taxation, health warnings, and public awareness campaigns. Strengthening and enforcing these policies can help reduce tobacco use, subsequently mitigating the impact on cataract prevalence.

In the present study prevalence of cataract is more among women as compared to men, and it is statistically significant which is similar to systemic review and meta-analysis conducted by Prasad et al, in which women had 69% higher odds of being cataract blind as compared to men.⁷ Studies consistently demonstrate a higher prevalence of cataract among women in India compared to men. This disparity can be attributed to various factors, including biological, social, and cultural determinants, as well as gender-based differences in healthcare-seeking behaviour. Hormonal changes associated with menopause may contribute to an increased risk of cataract development in women. Engaging women at the grassroots level through community-based interventions can empower them to take charge of their eye health. Initial intervention package should focused on the delivery of a set of strategies that collectively sought to address the 'awareness' and 'acceptability' dimensions of access, by enhancing women's experience of care and their awareness of services.⁸ Women's self-help groups, community health workers and local leaders can play a pivotal role in disseminating information, facilitating eye screenings and addressing social and cultural barriers to

accessing cataract care. Collaboration between government entities, non-governmental organizations and healthcare stakeholders is crucial for addressing gender disparities in cataract care. Policy initiatives should prioritize gender equity in eye health and ensure the inclusion of gender-specific perspectives in national programs and strategies.

CONCLUSION

High prevalence of cataract increases the burden on existing health care system. Ongoing research and initiatives should focus on improving early detection and referral, providing comprehensive post-operative care to reduce the burden of cataract and improve the quality-of-life outcomes among the individuals.

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