

Six years after manual small incision cataract surgery—Perspective from a secondary level eye hospital in Rural India

Alo Sen

Purpose: We assessed the long-term impact of manual small incision cataract surgery (MSICS) in rural Central India using patient reported outcomes (PRO). **Methods:** 841 patients undergoing MSICS by a single surgeon from January 2012 to July 2013 were included. The same patients were contacted telephonically in November 2019 and were asked to report their perceived outcome of the cataract surgery. Data on the fellow eye status were also collected. These data were compared with objective data recorded at the time of surgery. **Results:** The mean age was 61.53 ± 10.9 with 59% women. 96% had presenting visual acuity (VA) $\leq 5/60$. 86% had visually significant cataract in the fellow eye; 2.5% were cataract blind. 85% had unaided VA $\geq 6/18$ at 6 weeks. 223 patients were contactable by telephone after 6 years. 55 had expired and their relatives gave the information. Of these, 90% reported “good” outcome. PRO at 6 years and unaided VA at 6 weeks after surgery correlated significantly ($P = 0.05$). 40% had undergone cataract surgery of the fellow eye in the interim. Of those who reported “not good” outcome, 70% had undergone fellow eye surgery, compared with 38% in those who reported “good” outcome ($P = 0.005$). **Conclusion:** Telephonic PRO correlates with unaided VA 6 years after cataract surgery and could replace a follow-up visit. A PRO of poor vision in the already operated eye was the only factor correlating with fellow eye surgery.

Key words: Cataract surgery, patient reported outcomes, Rural India

In cataract surgery, success is frequently equated to an improvement in the best-corrected visual acuity (BCVA). However, in recent years there is a growing emphasis on understanding the impact of medical interventions on the lives of patients in terms of a patient reported outcome (PRO).^[1] Such information is essential for any efficient healthcare system as patient satisfaction is not only an important measure of postoperative success but also influences healthcare-seeking behavior of the entire population.^[2]

Chhatarpur district is situated at the North East border of Madhya Pradesh, with Mahoba district (U.P) to the east, Tikamgarh (M.P) to the west, and Sagar (M.P) to the south east. It was accessible only by road at the time the surgeries reported here were performed. As published in the census of 2011, the population of Chhatarpur was 1,762,375, with 77.36% of the population from rural areas, agriculture being the chief occupation. The average literacy rate in the rural area is 59.2% with a sex ratio of 880.^[3] The district has a government district hospital, 4 community health centres, and 8 primary health centres.

The purpose of this study is to assess the long-term impact of a secondary level eye care centre providing cataract surgery in terms of patient reported outcomes, the motivation to undergo cataract surgery of the fellow eye and the possible factors influencing the same using telephonic interviews.

Department of Ophthalmology, Christian Medical College, CMC Schell Campus, Vellore, Tamil Nadu, India

Correspondence to: Dr. Alo Sen, Christian Medical College, CMC Schell Campus, Vellore, Tamil Nadu, India. E-mail: alosen8281@hotmail.com

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Methods

As part of the private sector, the hospital in Chhatarpur where the study was conducted is a 150 bedded hospital. The eye department in this hospital caters to a population of about 500,000 with outpatient numbers of approximately 15,000 per year. It can be categorized as a secondary level eye care unit,^[4,5] manned by a single non-permanent ophthalmologist along with 3–4 other eye care personnel and is equipped to provide comprehensive eye care.

All the procedures followed were in accordance with the ethical standards of the responsible committee of the hospital. Data was collected of the 841 patients who underwent manual small incision cataract surgery with IOL implantation at the hospital between the periods of January 2012 and July 2013. This included demographic breakdown, status of fellow eye, literacy, geographical location of places of residence and distance from hospital, presenting vision, preoperative risk factors, intraoperative and postoperative complications, and visual outcome at 6 weeks follow-up. Telephone numbers were also collected for all the 841 patients.

In the month of November 2019, the author revisited the hospital. The same patients were again contacted individually by telephone using the contact numbers provided by the

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patients by a blinded investigator who had no prior contact whatsoever with the patients and who was supplied with no other information other than the patients telephone numbers. The patients were informed the purpose of the telephone call and after obtaining verbal consent for participation in the study, were asked whether they would consider the surgical outcome in the eye operated in this hospital as “good” or “bad.” This simple binary output was chosen because the patients were of an aged population and were finding considerable difficulty in answering a more detailed questionnaire. Data was collected regarding whether the fellow eye had also been operated and if so, where the surgery had been done. At the end of the telephonic interview all patients were also urged to come for a check up to the hospital. For patients who had expired, the above data was obtained from a reliable patient relative.

Results

The 841 patients had a mean age of 61.52 (S.D 10.9). Fifty-nine percent (*n* = 494) of patients were women and 53% (356) were illiterate. Sixty percent of the cataract surgeries were performed in the winter months, that is, between the months of November to March. The right eye was operated in 53% of patients. The mean distance travelled was 90 km (SD 132), however this represents a skewed distribution, the median of 35.50 km being more representative of the average. At the time of presentation for surgery, 86% (*n* = 724) of patients had visually significant cataract in the fellow eye, out of which 17% had advanced cataracts; 2.5% of patients were cataract blind.

Unaided vision was recorded with Snellen chart at 4 instances namely presenting vision, on the 1st postoperative day, 1 week after surgery, and 6 weeks after cataract surgery [Table 1].

Intraocular lenses were implanted in all patients except for 0.4% (*n* = 3) who were left aphakic due to inadequate support for both posterior and anterior chamber intraocular lens (2 with large PC rents and iridodialysis, 1 with PC rent and iris coloboma). Endophthalmitis was recorded in 0.2% patients (*n* = 2) resulting in loss of vision in spite of standard endophthalmitis management including intravitreal antibiotics.

Of the 841 patients, though all telephone numbers were attempted twice, only 27% (*n* = 223) patients were contactable. This is only to be expected as in the interim between 2013 and 2019 there could have been a change in phone numbers, migration, inadequate charge, loss of SIM card, etc. Of the 223 contacted, 55 patients had expired in the interim 6 years, but relevant data was obtained from a relative including quality of vision while the patient was alive.

Table 1: Unaided Visual Acuity at presentation and upto 6 weeks following surgery

Vision	Presenting (<i>n</i> =812)	1 st post op day (<i>n</i> =839)	1 week post op (<i>n</i> =725)	6 weeks post-op (<i>n</i> =340)
≥6/18	0.1%	25.6%	54.3%	84.4%
6/24-6/60	9.2%	52.8%	37.7%	12.9%
5/60-6/60	53.8%	17.0%	6.6%	1.2%
<1/60	36.6%	4.5%	1.4%	0.6%
PR inacc	0.2%	0	0	0.9%

Ninety percent of patients (*n* = 190) contacted by telephone reported that the eye which had been operated was “good.” Ten percent (*n* = 21/223) reported the vision of the operated eye to be “not good.” Five percent (12/223) patients were not sure and were excluded from analysis.

Out of the 223 patients contacted, 93 had also attended the follow-up at 6 weeks. For the sake of comparison between vision recorded at 6 weeks follow-up and patient reported outcome at 6 years, vision at 6 weeks’ follow-up was also divided into two categories. “Good,” which included unaided Snellen vision of 6/60 and greater and “not good,” which included unaided Snellen vision of 5/60 or less. There was significant correlation between the two (*P* = 0.05) [Fig. 1]. An unaided Snellen vision of 6/60 was taken as the lower limit of “good” vision because this is the minimum requirement for ambulatory vision. We did not categorize vision into further grades because of the binary nature of the PRO.

Forty percent (*n* = 81/223) of patients had undergone cataract surgery in the fellow eye, 60% (*n* = 118) had not. Of the patients who had undergone cataract surgery of the fellow eye, 62% had the surgery done in the same hospital, that is, the Christian Hospital, Chhatarpur. The remaining 38% had the surgery done in some other hospital. The mean distance travelled for surgery of the fellow eye was 141 km (SD 237), again a skewed distribution with median at 44 km.

Pearson correlation, Chi-square and Fisher exact tests were carried out to establish a relationship between sex, age at 1st eye surgery, literacy, distance to be travelled, and fellow eye surgery being done. None of the above correlations proved statistically significant. An analysis between vision recorded at 6 weeks visit and fellow eye surgery was not attempted as the number of patients (*n* = 12) in the “poor vision at 6 weeks’ subgroup” was too small to give meaningful results.

However, when “patient reported outcome” was analyzed with fellow eye surgery, there was a statistically significant association between the two using both Chi-square analysis and Fisher exact *t*-test [Table 2].

In patients who reported “good” outcome in the operated eye, 38% had undergone fellow eye surgery, and 62% had not. In patients who reported “not good” outcome in the operated eye, 70% had undergone surgery of the fellow eye and 30% had not.

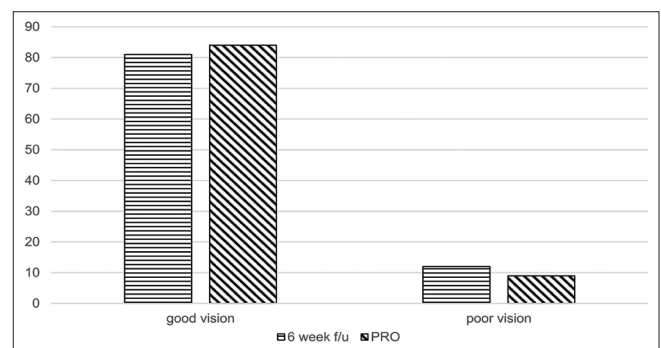


Figure 1: Unaided vision at 6 weeks after cataract surgery and PRO at 6 years. Number included for analysis = 93 *P* = 0.05

Table 2: PRO after 6 years and fellow eye surgery distribution

Operated Eye	Fellow eye		Total
	Operated	Not Operated	
PRO			
Good	67	111	178
Not good	14	6	20
Total	81	117	198

$P=0.005, 0.006$

Discussion

By 2020, more than 30 million people annually worldwide are predicted to undergo cataract surgery.^[6] The socioeconomic impact of cataract surgery is substantial, allowing an increase in economic productivity by up to 1500% of the cost of surgery during the first postoperative year.^[7,8] On the other hand, if left untreated, the visual disability due to cataract can result in unemployment.^[7,9] There are numerous studies related to cataract surgery and surgical outcomes from various parts of India, the majority of which are based in urban or semi-urban populations where eye care is easily accessible through eye institutes and eye camps.

The current study is based on patients presenting to a rural secondary level eye care centre. The population comprise primarily agricultural laborers with a literacy rate of 47% against a reported rate of 59% for this region.^[3] Sixty percent of the patients presented for surgery in the winter months, a finding which has also been documented in other studies conducted in North India and adjacent regions.^[9,10] The mean age of presentation was 61 years, with no difference in mean age among males and females (62 and 60 years, respectively). The male:female ratio undergoing surgery was 1:1.42. Although there are no studies from this part of India to compare with, studies done in other parts of the world and India do show a similar female preponderance in peripheral eye camp surgery as compared to base hospital surgery.^[11,12] A more detailed qualitative survey of attitude, for example, via a questionnaire on knowledge, attitude, and practices of the people of this region would be required to further study this. Unfortunately, this was beyond the scope of the present study.

Most of the patients had travelled within a 40 km radius for the first eye surgery, there was not a significant difference in distance travelled for fellow eye surgery and most patients (62%) had fellow eye surgery in the same hospital.

Ninety percent of the patients had a presenting vision of 5/60 or less in the eye to be operated. 2.5% of patients were cataract blind at presentation. The definition for cataract blindness was taken as presenting vision of <3/60 in both eyes. The prevalence of blindness reported in other studies across India ranges from 1.5 to 8%.^[13-16] The lower rate seen in our study could be due to a somewhat younger population (mean age 61 years) and differences in definition of cataract blindness, with most studies considering vision of <6/60 as the cut off.

There was a good surgical outcome with 84.4% of patients achieving unaided Snellen vision of 6/18 and better at 6 week follow-up. However, there was a large attrition rate as out of the 841 patients operated, only 340 actually turned up for the

prescribed check at 6 weeks. This is a reflection of the conditions in rural areas of India, where travelling is difficult and a visit to the hospital is usually undertaken only if it is thought absolutely necessary.^[17]

Though telephone numbers were taken for all 841 patients, after 6 years, only 223 were contactable. The majority of patients (90%) reported a good outcome in the operated eye. Although there have been studies documenting PRO after cataract surgery^[18] to the best of our knowledge, there have been no prior studies detailing PRO 6 years after cataract surgery. More importantly, though the number of patients who attended the postoperative check-up at 6 weeks and who were again contactable by telephone at 6 years were small (93 patients there was good statistically significant correlation between the unaided vision measured at 6 weeks follow-up and the patient reported outcome after 6 years ($P = 0.05$). We agree that there is the possibility of a number of confounders such as the development of posterior capsular opacity, diabetic retinopathy, patients wanting to be polite to the interviewer. However, the fact that we found a statistically significant correlation between the postoperative measured vision and the PRO makes us believe that the surgical outcome is the chief determining factor for the current vision. In addition, the phone call was done by a blinded investigator with whom the patients had no prior contact and who had no other data apart from the patient's mobile phone number.

This makes a case for telephonic follow-up of patients, especially in inaccessible regions of the world, where patients find difficulty in coming to the hospital for long term follow-up in routine cataract surgery.

Of the patients contacted by telephone 118 (60%) had not undergone surgery of the fellow eye in the interim 6 years. This becomes even more surprising considering the fact that 86% of patients had a visually significant cataract in the fellow eye at initial presentation. Though most patients had had fellow eye surgery at the same hospital, 38% had at another hospital. This was probably because there was no permanent ophthalmologist at the hospital after 2013.

In most studies, the major barrier preventing patients from accessing healthcare for cataract surgery was person related or "attitudinal"- especially a lack of perceived need. Only after this were other barriers such as cost of treatment, accessibility of treatment.^[19-21] However, most of the above and other such similar studies were conducted in urban and semi-urban areas where healthcare is relatively easily available.

In our study there was no correlation between various factors such as sex of the patient, age at first eye surgery, literacy levels, distance to be covered and fellow eye cataract surgery. Analysis of actual measured vision at the 6 week follow-up visit and fellow eye surgery could not be done as the numbers were too small to produce meaningful results.

On comparing PRO and fellow eye surgery, the majority of the patients who reported good vision in the operated eye, did not undergo surgery in the fellow eye, whereas patients who felt the vision in the operated eye to be poor, did get the fellow eye operated. This trend was found to be statistically significant.

In other words, patients who felt vision in the operated eye to be good probably did not feel the need to get the fellow eye

operated, whereas patients who felt vision in the operated eye to be poor, did feel the need to get the fellow eye operated.

This highlights the fact, that even in areas where accessibility to healthcare is difficult, it is not the infrastructural issues which play a major part in patients accessing healthcare; rather it is the patient's own "felt need" which influences the decision to get the fellow eye operated.

This is most likely due to the fact that these patients belonged to an aged and marginalized section with limited resources, for whom reasonable ambulatory vision—adequate for independent day to day functioning in at least one eye is perceived as the requirement.

Patients who had a good surgical outcome in the operated eye, probably did not feel any need for fellow eye surgery as they were able to manage adequately for their needs with the vision in the one eye. Patients with poor surgical outcome in the primary operated eye, were not able to function independently once vision in the fellow eye started failing due to cataract. These aged people were then forced to seek eye care and subsequently undergo cataract surgery for the fellow eye. This finding has potential to impact planning and delivery of eye care services in rural and less affluent sections of India and merits further study.

Limitations

At the 6 weeks follow-up in 2013 there was a high patient attrition rate which is again observed in 2019 when the author went back to the hospital and many patients were not contactable by telephone. Although all patients who were thus contacted, were urged to come to the hospital for complete ophthalmological examination, only 30 patients of the 223 contacted came to the hospital. Due to lack of adequate infrastructure a detailed house to house survey and patient tracing was not possible which would have given the opportunity for a more detailed questionnaire and clinical assessment.

Conclusion

In rural areas of India, where healthcare is accessible with difficulty and patients are reluctant to come for seemingly routine follow-up after cataract surgery, patient reported outcome collected by telephone correlates well with measured unaided vision, even 6 years after cataract surgery. The majority of patients do not operate the fellow eye if they have good vision in the operated eye, adequate for their day to day needs. Sex, age at first eye surgery, literacy rates and distance to be travelled have no correlation with second eye surgery, rather it is the patient's own perception of poor vision in an already operated eye combined with possibly failing vision in the fellow eye due to cataract which motivates them to undergo fellow eye surgery.

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Conflicts of interest

There are no conflicts of interest.

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