

## Sight Restoration Rate (SSR): Measure of Cataract Surgery Success

Navin Chandra<sup>1</sup>, Utkarsh Bhardwaj<sup>2</sup>, Rajesh Tiwary<sup>3</sup>

<sup>1</sup>Senior Resident, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India

<sup>2</sup>Senior Resident, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India

<sup>3</sup>Professor, Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India

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Corresponding author: Dr. Utkarsh Bhardwaj

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### Abstract

**Aim:** The aim of this study to determine the rate of sight restoration as a useful indicator to measure impact of cataract surgery. **Methods:** This study conducted in the Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India, from July 2017 to June 2018. All of the eye examinations were performed by the same operator. Pre- and post-BCVA were categorized into four categories according to WHO classification. The categories are 6/6-6/18, 6/18-6/60, 6/60-3/60, and 3/60-No Light Perception. **Result:** Our study included 230 eyes 20 lost follow-up 10 had comorbidities in form of corneal opacities, optic nerve atrophy, retinal detachment, congenital anomalies. Total 200 patients were included in this study. Out of 200, 53% were male and 47% were female. The average age of the patients 37.5 years. Most of the patients 40-50 years. 5 of the visual impairments could not be cured due to co- morbidities. The SRR of the surgery in our study 50%. SRR is an indicator to determine the impact of conducting cataract surgeries on people's productivity. In measuring SRR, the best visual acuity of either eye in a patient before the surgery is used. If the best visual acuity of either eye is already more than 3/60, then the cataract surgery is not considered as having an effect on people's productivity. This is the key difference which differentiates SRR from other indicators which are used to determine the success of cataract surgery. Visual outcome <3/60 in 10 eyes (0.5%). **Conclusion:** SRR of the surgery in this research is 50%, while our poor surgical outcome is 5%. High SRR means that a lot of these patients can return to work, while poor surgical outcome means that the surgeries have very good standard.

**Keywords:** SRR, Cataract Surgery, Ophthalmology.

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### Introduction

The eyes are the sensory organs which have an important role in human's ability to see. According to WHO data in October 2018, there were 217 million of people around the world with severe visual impairment.

Furthermore, 36 million people were blind. Blindness causes difficulty in providing a stable livelihood for the family, participating in social activities, and doing daily activities. Moreover, blind people will become a burden for their family

economically and socially due to the stigma towards people with disability. All of that will affect the country's economic conditions later.[1] WHO campaigned, Vision 2020 program, is to overcome blindness and disabilities related to vision around the world. In Indonesia, Vision 2020 was accepted by president Megawati Soekarnoputri in 2000. The aim of this program is to treat all vision visual impairments around the world which can be prevented or cured.[2] A cataract is one of the blindness which can be cured by replacing the cloudy lens with an artificial intraocular lens. Replacing the lens will not only restore the patient's visual acuity but will also restore their quality of life. Cataract is a public health problem in many developing countries, including India. Traditionally, the cataract intervention programme is evaluated by the number of cataract operations performed per year. In India this has increased from 1.2 million in 1989 to 2.7 million operations in 1996.[3] However impressive this increase may be, the figure does not indicate the extent to which the problem of cataract blindness has been reduced. Two indicators are used to measure impact. First, it can be measured by a change in prevalence of cataract blindness, obtained through community-based surveys. Since blindness surveys are costly and lengthy exercises, these are not conducted regularly. In India, a national study was done in the period 1971-74 and a National Survey on Blindness in 1986-89. The variation in prevalence of blindness and visual impairment due to cataract over this period indicates the impact surgical services have had on the magnitude of the problem. The second indicator to measure impact is Cataract Surgical Coverage (CSC).[4,5] This community based parameter compares the proportion who have received surgery (aphakic) to the total, who still need or have had surgery (aphakic + operable cataract) in a certain area. It

indicates to what extent the services have covered the needs. It measures the effectiveness of the cataract intervention programme in providing surgical services and, as such, it is an output indicator and does not measure the quality of cataract intervention.

### Material and methods

This study conducted in the Department of Ophthalmology, Nalanda Medical College and Hospital, Patna, Bihar, India, from July 2017 to June 2018. This study received the ethical clearance from the Hospital Ethical Committee. Medical records of patients who did Cataract Surgery either SICS or Phacoemulsification, best corrected visual acuity (BCVA) was conducted using the Snellen chart and a pinhole. All of the eye examinations were performed by the same operator. Pre- and post-BCVA were categorized into four categories according to WHO classification. The categories are 6/6-6/18, 6/18-6/60, 6/60-3/60, and 3/60-No Light Perception. Out of all data we excluded patient who did not follow up and all patients with comorbidities which may influence post-operative outcome remaining data considered for analyses.

### Methodology

All records exported from electronic medical records to excel sheet and analyzed with SPSS 25.0. Frequency calculated using descriptive analyses. The frequency of each BCVA categories is taken into accounts. After that we consider frequency and proportion of co-morbidities of the patients. Sight Restoration Rate is calculated using the following formula.<sup>6</sup>  $P(\text{pre}) = \text{number of patients with BCVA} < 3/60 \text{ on either eye before the surgery}$   $P(\text{post}) = \text{number of patients with BCVA} > 3/60 \text{ on the operated eye}$ .

Total cataract operations /year = number of the performed cataract surgery

$$\text{SRR} = \frac{\text{P (post)} - \text{P (pre)} \times 100}{\text{total cataract operations/year}}$$

**SRR = Sight Restoration Rate**

### Result

Our study included 230 eyes 20 lost follow up 10 had comorbidities in form of corneal opacities, optic nerve atrophy, retinal detachment, congenital anomalies. Total 200 patients were included in this study. Out of 200, 53% were male and 47% were female. the average age of the patients 37.5 years. Most of the patients 40-50 years. 5 of the visual impairments could not be cured due to co- morbidities. The SRR of the surgery in our study 50%. SRR is an indicator to determine the impact of

conducting cataract surgeries on people's productivity. In measuring SRR, the best visual acuity of either eye in a patient before the surgery is used. If the best visual acuity of either eye is already more than 3/60, then the cataract surgery is not considered as having an effect on people's productivity. This is the key difference which differentiates SRR from other indicators which are used to determine the success of cataract surgery. Visual outcome <3/60 in 10 eyes (0.5%)

**Table 1: gender of the patients**

Gender	Number of patients =200	%
Male	106	53
Female	94	47

**Table 2: age of the patients**

Age in years	Number of patients	%
Below 20	10	5
20-30	40	20
30-40	52	26
Above 40	98	49

**Table 3: Rate of SRS**

Rate of SRS	Number of patients =200	%
	100	50

A study in the United States showed cataract surgery not only restores the patients' life quality but also has a very high return on investment (ROI) up to 45.67% 13 years after the surgery.[7] Another study stated cataract surgery is one of the most effective health interventions which will reduce the cost of rehabilitating the patient with a disability with an estimated reduction of 2040\$/year/people.[8] It happens because blindness has a huge correlation with economic productivity of its victim and the caretakers for a very long time if it is not cured.[9] One of the indicators of the success of the cataract

surgeries is the Sight Restoration Rate (SRR).[8] SRR shows the percentage of patients whose sight restored after the surgery. The weakness of using SRR is this measure can be influenced by selectively removing patients whose sights failed to be restored. However, all patients who were operated during the study period are also included to minimize the bias. Performing eyes surgery with BCVA more than 3/60 are not the goal of Vision. 2020. The eyes surgery's main goal is not only to reduce the numbers of blindness but also to increase patients' life quality.[7] The SRR of the eyes surgery in this study is 50%. This

number is higher than other surgeries performed by Eye camps (39%), Ludhiana (35%), and Ludhiana'94 (28%).<sup>6</sup>

The better way to selectively choose those who would gain the most benefit from the surgery is needed. Hence, some patients who have a bad prognosis still need the surgery to prevent the later complications (e.g. hyper-mature cataract which can lead to capsular fibrosis, phacolytic-Phacoanaphylactic reaction, or zonula dialysis). Developing countries have a high number of blindness because some residences are far from health facilities. Timely and more targeted screening is essential in resolving this problem.[9,10,11] Another important factor in handling this problem is to empower the communities to socialize the benefit of cataract surgery. A study showed 2/3 of patients are convinced to have the surgery due to the encouragement from family or close relatives.[11]

Another factor which can be used to determine the success of cataract surgery is the proportion of patients with the poor surgical outcome (i.e. BCVA <3/70).<sup>6</sup> The proportion of BCVA <3/60 of the eyes surgery in this study is 0.9%. This number is lower than the criteria from WHO for poor outcome, which is 5%.[12] The main cause of poor outcome is uncorrected refraction problem, comorbidities, and surgical complications. The quality of cataract surgery can be improved by retraining the operator, improving the health system, facilities, and surgical equipment, and establishing a better monitoring system.[13] Unfortunately, the lack of human resources is still the main problem in developing countries. There must be a balance between intervention costs and its results when conducting cataract surgery in resource-limited settings.[14]

### Conclusion

SRR of the surgery in this research is 50%, while our poor surgical outcome is 5%. High SRR means that a lot of these patients

can return to work, while poor surgical outcome means that the surgeries have very good standard.

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