



Sight restoration rate (SRR): Useful indicator to measure impact of cataract surgery

Dr. Mehul A Shah^{1*}, Dr Shreya M Shah², Dr. Deeksha Thorat³, Dr Heena Patel⁴, Dr Ruhi Gunay⁵

¹⁻⁵Department of Community Ophthalmology, Drashti Netralaya, Dahod, Gujarat, India

Abstract

Untreated cataracts can reduce the productivity of patients and his/her caretaker for quite a long time. Cataract surgery will not only cure the patient's blindness, but it will also improve the local economy if it is sustainable and on time. With advent of superior technologies cataract surgery performed in urban areas may target patients with vision more than 6/18 vision which in turn may not be sight restoration surgery, though number of surgery is more but sight restoring rate may be less so we need to use this indicator to determine actual impact.

Lack of human resources, funds, and medical equipment are the major problems for performing cataract surgery.

Keywords: restoration, Measure, Untreated, caretaker

1. 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 (World Health Organization, 2018) [1]. Cataracts are responsible for 47% of all cases of blindness worldwide. The epidemiological impacts of cataracts are not the same in different countries, and the rates are associated with the prevailing economic conditions. In developed countries with good healthcare, cataracts account for only 5% of the cases of blindness, whereas the issue is still responsible for 50% of such cases in the developing countries. After a brief overview of the historical, clinical, and therapeutic aspects, this article presents an update on the global epidemiological cataract data. It also provides insights into the political, socioeconomic, and cultural factors that adversely affect the availability of healthcare in developing countries, making cataract a major public health concern and an impediment to development [2].

The prevalence of cataracts increases with age. As the world's population ages, the incidence of cataract-induced visual dysfunction and blindness is rising, which represents a significant global problem. The challenges include preventing or delaying the formation of cataracts and treating those that occur [2].

Cataracts can be cured by surgery; however, this option is not equally available everywhere and all surgical methods do not produce similar outcomes. Standard surgical services capable of providing good visual rehabilitation must be made accessible to all in need, regardless of their circumstances. The establishment and sustained delivery of these services requires comprehensive strategies that go

Beyond a narrow focus on surgical techniques. Changes in governmental priorities, population education, and an integrated approach to surgical and management training are warranted [3]. India is a signatory to the World Health Organization Resolution on Vision 2020. The concerted efforts of all the stakeholders have resulted in a hike in the number of cataract surgeries performed in the country. However, the actual impact of these measures on the elimination of avoidable blindness is unknown [4,5].

Material and Methods

This study received the ethical clearance from the Hospital Ethical Committee.

Medical records of patients who did Cataract Surgery either SICS or Phacoemulsification October to December March 2018 at Drashti Netralaya, 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.

All records exported from electronic medical records to excel sheet and analyzed with SPSS 22. 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 [6].

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

SRR = Sight Restoration Rate

P (pre) = number of patients with BCVA <3/60 on either eye before the surgery

P (post) = number of patients with BCVA >3/60 on the operated eye

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

Result

Our cohort included 1986 eyes 624 lost follow up 47 had comorbidities in form of corneal opacities, optic nerve atrophy, retinal detachment, congenital anomalies. Four of the visual impairments could not be cured due to comorbidities. The SRR of the surgery in our study 50.2 %. 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 12 eyes (0.9%)

Discussion

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 4567% 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/person (Murthy *et al.*) [4]. 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 (Wang *et al.*, 2016) [8].

One of the indicators of the success of the cataract surgeries is the Sight Restoration Rate (SRR) [4]. 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 (Limburg *et al.*, 1996) [7]. The SRR of the eyes surgery in this study is 46.70%. This number is higher than other surgeries performed by Eye camps (39%), Ludhiana (35%), and Ludhiana'94 (28%) [6].

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 (2016 [8, 10, 11]; Mahalingam, 2005) [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 Mahalingam, 2005) [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) (Limburg *et al.*, 1996) [6]. 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% (Malik *et al.*, 2016) [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 (Isawumi *et al.*, 2009) [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 (Khandekar *et al.*, 2015) [9].

Conclusion

SRR of the surgery in this research is 46.75%, while our poor surgical outcome is 4.34%. High SRR means that alot of these patients can return to work, while poor surgical outcome means that the surgeries have very good standard. This will optimize "peoples right for sight" as was suggested with Vision 2020 motto.

References

1. Angelo Doniho, Angela Shinta, Dewi Amita, Cisca Kuswidyati, Devina Permatasari, Andrew Adiguna Halim, *et al.* Determination on the Success of Cataract Surgeries by Using Sight Restoration Rate (SRR).
2. Lawani R, Pommier S, Roux L, Chazalon E, Meyer F. Magnitude and strategies of cataract management in the world. *Med Trop (Mars)*. 2007; 67:644- 50.
3. Brian G, Taylor H. Cataract blindness—challenges for the 21st century. *Bull World Health Organ*. 2001; 79:249- 56.
4. Murthy G, Gupta SK, John N, Vashist P. Current status of cataract blindness and Vision 2020: The right to sight initiative in India. *Indian J Ophthalmol*. 2008; 56:489- 94.
5. Muhtaseb M, Kalhoro A, Ionides A. A system for preoperative stratification of cataract patients according to risk of intraoperative complications: A prospective analysis of 1441 cases. *Br J Ophthalmol*. 2004; 88:1242- 6.
6. Chan E, Mahroo OA, Spalton DJ. Complications of cataract surgery. *Clin Exp Optom*. 2010; 93:379- 89.
7. Limburg H, Kumar R, Bachani D. Monitoring and evaluating cataract intervention in India. *The British Journal of Ophthalmology*. 1996; 80(11):951-5. <https://doi.org/10.1136/bjo.80.11.951>
8. Wang W, Yan W, Fotis K, Prasad NM, Lansingh VC, Taylor HR, *et al.* Cataract surgical rate and socioeconomics: A global study. *Investigative Ophthalmology and Visual Science*. 2016; 57(14):5872-5881.

9. Khandekar R, May W, Alasbali T. Indicators for monitoring cataract surgery outcomes; evolution and importance. *Nepalese Journal of Ophthalmology*. 2015; 7(1):3. [https:// doi.org/ 10.3126/nepjoph.v7i1.13144](https://doi.org/10.3126/nepjoph.v7i1.13144)
10. Khandekar R, Sudhan A, Jain B, Deshpande M, Dole K, Shah M, Shah S. Impact of cataract surgery in reducing visual impairment: A review.
11. Mahalingam K. Evaluation of cataract surgical service delivery to the visually impaired. *The Indian Journal of Social Work*. 2005; 66(3):280-309.
12. Malik AR. Cataract Surgery Visual Outcomes and Associated Risk Factors in Secondary Level Eye Care Centers of L V Prasad Eye Institute. *British Journal of Ophthalmology*. 2016; 20(1):1-11.
13. Isawumi ES, Adeoti AO, Adeoye COA. (2009). Evaluation of Cataract Surgery Outcome in Western Nigeria. *Ghana Med J*. Retrieved, 2009. from [https://www.ncbi.nlm.nih.gov/pmc/ articles/ PMC2956367](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2956367).