Evaluation of Visual Outcomes Before and After Cataract Surgery in Adult Patient

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Abstract—
Introduction: Cataract is one of the leading causes of visual impairment worldwide, mainly affecting the adult and elderly population. Cataract is a gradual cloudiness of the transparent ocular lens. The crystalline lens is a transparent structure. Its transparency may be disturbed due to degenerative process leading to opacification of lens fibers. Development of opacity in the lens is known as cataract. Cataract means any opacity of the lens or its capsule causing visual impairment is called cataract.
Purpose: To compare and evaluate the pre-operative and post-operative visual acuity in adult patients undergoing cataract surgery, and to assess the impact of cataract surgery on patient's vision, visual outcomes, post-operative complications, and overall satisfaction.
Methods: There are several methods can be used to evaluate visual outcomes before and after cataract surgery. Visual acuity and ocular condition were assessed using clinical examinations including Snellen's chart, torch light examination, intraocular pressure measurement, and slit-lamp examination before and after surgery.
Result: A total of 101 adult patients, where 57 males and 44 females were included in the study, of whom 60 had associated systemic diseases such as diabetes, hypertension, thyroid disorders, stroke, or cardiac disease. The results revealed a significant improvement in visual acuity in 98% of the patients following cataract surgery. Only 1.98% of patients showed no improvement, mainly due to systemic diseases and post-operative complications. In terms of satisfaction, 26 patients were very satisfied, 44 were satisfied, 23 were neutral, and 8 were unsatisfied with their surgical outcome.
Conclusion: The research confirms that cataract surgery is a safe, effective, and beneficial procedure for improving visual function in adult patients. It also highlights the need for comprehensive medical evaluation and proper follow-up care to minimize complications and enhance visual outcomes.

Key words — Cataract surgery, pre-operative assessment, post-operative outcomes, Visual improvement, Patient satisfaction, post-operative complications.

I. INTRODUCTION

Cataract is a gradual cloudiness of the transparent ocular lens. The crystalline lens is a transparent structure. Its transparency may be disturbed due to degenerative process leading to opacification of lens fibers. Development of an opacity in the lens is known as cataract. Cataract means any opacity of the lens or its capsule causing visual impairment is called cataract. [1,2,4,6] Cataract is a leading cause of blindness. Cataract is primarily an aging phenomenon that can't be prevented. However, vision impairment by cataract can be restored by surgery. [3,5] Congenital cataract is present at birth. Congenital or developmental cataract develops during the development of the lens. Congenital or developmental cataract has therefore, a tendency to affect a particular zone, which was being formed when this process is disturbed. [1,6] Acquired cataract is a clouding of the lens of the eye that develops after birth, typically due to age, injury, or as a manifestation of other medical conditions. Acquired cataract is distinct from congenital cataract, which is present at birth. [1,6] A nuclear cataract is located in the center of the lens. The nuclear cataract tends to darken, changing from clear to yellow and sometimes brown. [1,4,6] Cortical cataract may involve the anterior, posterior or equatorial cortex. A cortical cataract affects the layer of the lens surrounding the nucleus. The cataract looks like a wedge or a spoke. [1,4,6] A posterior capsular cataract is found in the back outer layer of the lens. This type often develops more rapidly. [1,4,6]

Sign of cataract may be reduced to finger count and hand movements in dense opacity. [1,2,6] It is grayish, white, yellow, and brown (better appreciated in dilated pupil). [1,2,6] Irish shadow usually present. [2,6] Fundal glow: initially little change of the fundal glow may be seen with ophthalmoscope, except that the fundus details are hazy. Later, the fundal glow may be entirely blackened. [4,6]

Symptoms of cataract are gradually impaired vision at distance and near. [1,3,4,6] Patient has blurred vision

and double vision. [1,3,5,6] Seeing rainbow halos around lights. [3,5] Lens becomes cloudy or hazy. [2,6]

Causes of cataract are an injury to the eye can damage the lens and lead to cataract formation. [2,3,6] Some babies are born with cataracts or develop them early in life due to genetic conditions or infections during pregnancy. [3,5,6] Diabetes (high blood sugar) can damage the lens and increase cataract risk, Hypertension (high blood pressure), Obesity may contribute to metabolic changes affecting the lens. [3,5,6] Long term use of corticosteroids can be affects lens and increasing risk factor of cataract.[3] Smoking and alcohol, both are increasing risk of cataracts due to oxidative stress on the eye tissues. etc. [2,3,5]

Cataract treated by two methods, non-surgical method: stronger prescription glasses, Brighter lighting for reading and tasks, magnifying lenses, anti-glare sunglasses use for reduce sensitivity of light. [1,4,5] Surgical method: the clouded natural lens is removed, it is replaced with an artificial intraocular lens (IOL). [1,4,5]

In the year of 2019 “S.Louison”, “J.Blanc”, “C.Pallot”, “S.Alassane”, “A.Praudel”, and “C.Creuzot-Garcher” has done the research on visual outcomes and complications of congenital cataract surgery in France. According to their research they found that 56 consecutive procedures were evaluated in 37 infants. Overall 26.8% of patients had unilateral cataract and 73.2% had bilateral cataracts. And Post-operative complications was present in 60.0% in unilateral cataract and 46.3% in bilateral cataract.

In the year of 2016 “Sumathi Matta”, “Jiwon Park”, “Ghanshyam Palamaner”, “Subash Shantha”, “Rohit C Khanna”, and “Gullapalli N Rao” has done the research on cataract surgery visual outcomes and associated risk factors in secondary level eye care centers of LV Prasad Eye Institute in Hyderabad, India. According to their research 1.4% patient’s had pre-operative complications and 61.8% patient’s had a good visual outcomes and based on best corrected visual acuity, 91.7% patient’s had good outcomes. Based on PVA and BCVA those with less than 6/60 were only 2.9% and 1.6% respectively. Using multivariable analysis, poor visual outcomes were significantly higher in patients aged > 70.

In the year of 2000 “R.Anand”, “A.Gupta”, “J.Ram”, “U.Sing”, “R.Kumar” has done the research on visual outcomes following cataract surgery in rural area in Punjab. According to their research the found that total 428 cataract operated eyes and 72 were blind (VA < 3/60), 162 had low visual acuity (VA 3/60 to <6/18) and 194 eyes had good visual acuity after cataract surgery (VA > or = 6/18).

In the year of 1999 “H Kapoor” and “A Chatterjee” has done the research on evaluation of visual outcomes of cataract surgery in an Indian eye camp in Ludhiana, Punjab. According to their research operated eyes of the patient 94.8% they all had a visual acuity less than 3/60 and they found that visual outcomes 11.3% eyes of the patient those all had a visual acuity 6/60 (poor outcomes) and 79.9% eyes of the patient had better visual outcomes (6/18).

Aim:
To evaluate the improvement in visual acuity and patient satisfaction after cataract surgery in adult patients.
Objectives:
To compare and evaluate pre-operative and post-operative visual acuity in adult patients.
To analyze the impact of cataract surgery on patient’s vision.
To find out the visual outcomes of patients after cataract surgery.
To find out post-operative complications of the adult patients.
To find out patient’s satisfaction after cataract surgery.

II. METHODS & MATERIALS

The present observational study was conducted among adult patients of “Arora Eye Hospital and Retina Centre”, Jalandhar, Punjab were involved in the study who were came on the hospital for follow-up visit. This study was done by various methods from July to November 2025.
Study Design: The study was quantitative and observational study. Adult patients from “Arora Eye Hospital and Retina Centre”. In this study total 101 patients were approximately included.
Inclusion criteria:
1. Adult aged patients (age group 18 years and above).
2. Patient’s from “Arora Eye Hospital & Retina Centre”.
3. Diagnosed with visually significant cataract.

4. Able to undergo complete pre-operative and post-operative visual assessment.
5. Those who provided written informed consent.

Exclusion criteria:
1. Presence of other ocular diseases (glaucoma, diabetic retinopathy, macular degeneration, corneal opacities etc.).
2. Patients from other eye hospitals.
3. Inability to attend for follow-up visits during the study period.
4. History of previous intra ocular surgery.
5. Non-cooperative patient's or those unable to provide informed consent.

III. METHODOLOGY

History taking: History taking is very important because, with the help of history taking we can understand the patient's medical history to see if he/she has any problems related their vision and ocular problems.

Visual acuity measurement: visual acuity is the measurement of the ability of the eye to distinguish shape, size of the objects at a given distance. It is measured at a distance of 6m by Snellen's chart as a monocular estimation. It is important to assess visual acuity (VA). With the help of visual acuity measurement, we examine pre- operative and post-operative vision of the patients and identify vision improvement level of the patients.

Torch light examination: Torch light examination is the process to observe the external parts of the eye lids, lashes, conjunctiva, Pupil, cornea, sclera, iris and any abnormal conditions of the eye.

Intra ocular pressure measurement: Intra ocular pressure measurement is very important part of pre and post cataract operation. Which is helps to examine IOP of the eye after and before cataract surgery.

Slit lamp examination: Slit lamp examination is very important part in pre-operative and post-operative condition. With the help of slit lamp, we can identify types of cataracts and grading of cataract before cataract surgery and after cataract surgery we can identify any dislocated condition of IOL, PCO and any other ocular conditions.

IV. RESULT

101 numbers of patients are participated in this study. Out of total patients 57 males 44 females [Chart 1]; While, 60 patients had systemic diseases like diabetes, hypertension, thyroid, stroke, cardiac disease etc. and 40 patients had no systemic abnormalities [Chart 2]. It was also seen that the ratio of post-operative complications 60% and 40% [Chart 3]. To determine the pre-operative and post-operative visual acuity by clinical examination at hospital. It was found that maximum patient's vision had improved significantly [Fig 1]. And some patient's vision did not improve because they had systemic diseases and post-operative complications. Among the total number of patients 26 patients were very satisfied after cataract surgery, 44 patients were satisfied after cataract surgery, 23 patients were not fully satisfied (neutral) after cataract surgery and 8 patients were unsatisfied after cataract surgery [Fig 2].

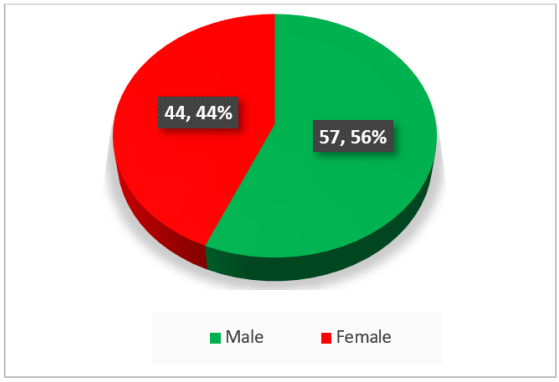

Chart 1: Gender wise patient distribution

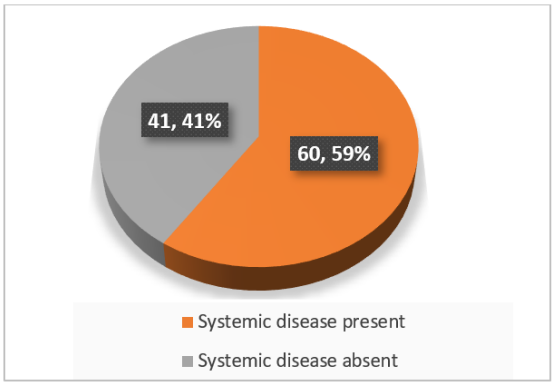

Chart 2: Systemic diseases present or absent

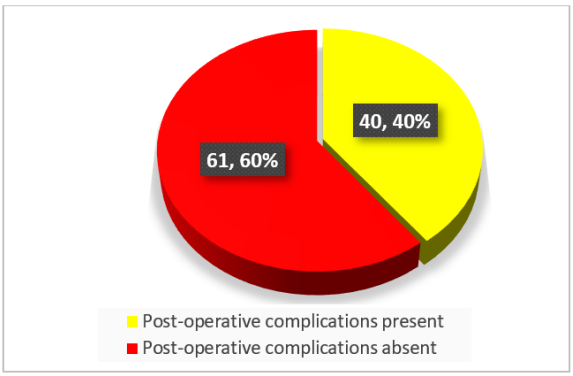

Chart 3: Post-operative complications present or absent

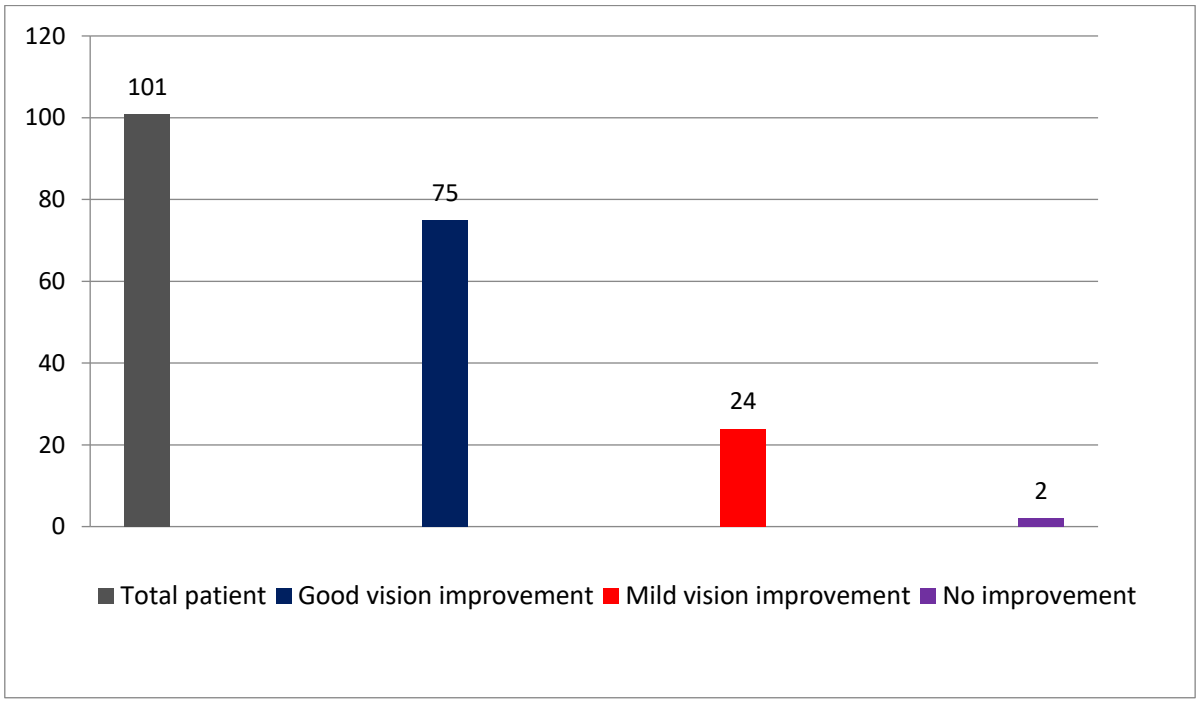

Fig 1: Frequency of visual acuity improvement after cataract surgery

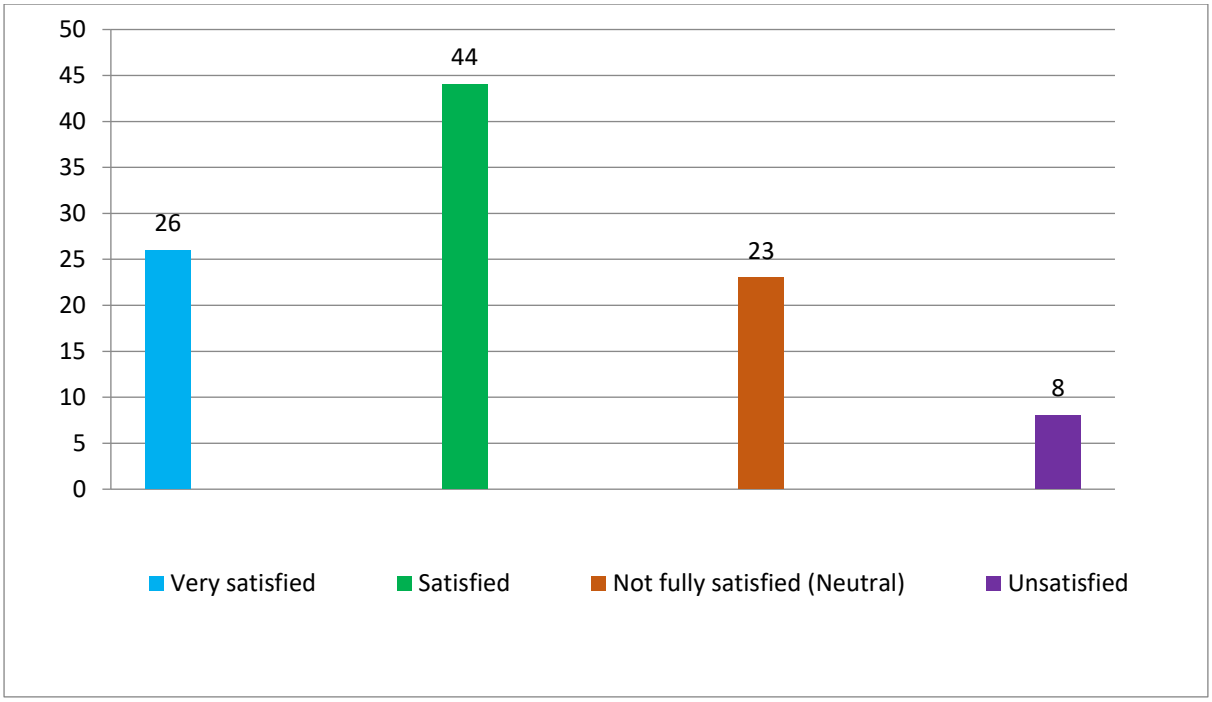

Fig 2: Frequency of satisfaction level after cataract surgery

Table-1: Comparison between pre-operative and post-operative visual acuity

Visual acuity	Pre-operative	Post-operative
PL^{+}	2	0
1/60	1	1
2/60	3	0
3/60	11	1
6/60	23	0
6/36	23	5
6/36P	9	3
6/24	15	4
6/24P	10	1
6/18	0	3
6/18P	1	3
6/12	2	11
6/12P	1	8
6/9	0	30
6/9P	0	16
6/6P	0	5
6/6	0	10

Total Patient	Total Vision Improvement	No Vision Improvement
101	98%	1.98%

Table-2: Percentage of visual acuity improvement after cataract surgery

V. DISCUSSION

This study was conducted to evaluate the visual outcomes of adult patients after cataract surgery at "Arora Eye Hospital and Retina Centre" Jalandhar, Punjab. The primary objective was to compare pre-operative and post-operative visual acuity and to assess patient satisfaction and complications following surgery.

The results of this study showed a significant improvement in visual acuity in 98% of patients after cataract surgery, while only 1.98% of patients showed no improvement.

This finding strongly supports the effectiveness of cataract surgery as a highly successful intervention for restoring vision in adults with visually significant cataract.

The data also revealed that a considerable number of patients had systemic conditions such as diabetes, hypertension, thyroid disorders, stroke, and cardiac disease. These systemic diseases were identified as important contributing factors in the few cases where visual improvement was unsatisfied.

In terms of satisfaction, the majority of patients reported a positive experience after surgery: 26 patients were very satisfied and 44 were satisfied,

indicating a strong correlation between improved vision and patient satisfaction. However, a smaller group of patients (23) expressed neutral feelings and 8 patients were unsatisfied, primarily due to post-operative complications or minimal improvement in vision. This highlights the importance of proper pre-operative assessment, management of systemic conditions regarding possible outcomes and complications.

The findings of this study align with earlier research conducted in rural Punjab, where most patients achieved visual acuity of 6/18 or better after surgery. However, unlike previous studies that did not specify reasons for poor outcomes, this study emphasizes that systemic diseases and post-operative complications played a major role in reducing visual improvement in some patients.

Overall, the study confirms that cataract surgery is a safe, effective, and beneficial procedure for improving visual function in adult patients. It also highlights the need for comprehensive medical evaluation and proper follow-up care to minimize complications and enhance visual outcomes.

VI. CONCLUSION

This study concludes that cataract surgery is a highly effective and successful method for improving visual acuity in adult patients. The comparison between pre-operative and post-operative visual acuity clearly demonstrated that 98% of the patients experienced significant improvement in vision, while only 1.98% showed no improvement. This confirms that cataract surgery plays a crucial role in restoring vision and enhancing the quality of life of individuals suffering from cataract.

The majority of the patients expressed satisfaction with the outcome of surgery, with 26 patients being very satisfied and 44 satisfied. This indicates a strong positive relationship between improved visual acuity and patient satisfaction.
However, a small number of patients remained unsatisfied or neutral due to the presence of systemic diseases such as diabetes and hypertension and post-operative complications, which affected visual recovery in those cases.

The findings of this study also highlight the importance of early diagnosis, proper management of systemic conditions, careful surgical planning, and regular follow-up visits to achieve the best possible visual outcomes after cataract surgery.

In conclusion, cataract surgery is a safe, reliable, and beneficial intervention in adult patients, and with proper pre-operative assessment and post-operative care, the success rate can be further improved.

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