

# Outcomes Of Visual Acuity Before and After Cataract Surgery

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**Abstract:** Cataracts remain the leading cause of blindness in our country and globally. Cataract surgery has a high success rate in improving visual acuity. **Objective:** This study aimed to analysis and assess clinical findings of Visual acuity before and after surgery for patients who underwent Cataract surgery. **Patients and methods:** A cross-sectional study was conducted on 75 patients who participated in visual acuity assessments conducted in different hospitals in Iraq between 4 April 2022 and 19 August 2023. The study evaluated visual acuity before and after cataract surgery in patients aged between 50 and 70 years. **Results:** Our study found that males had a higher rate of cases with 60% than females with 40%, 45% of the patients developed by obesity; most comorbidity prevalence in the patients were posterior subcapsular opacity, which had 45 cases, operative time, min was 15-30 minutes per eye, postoperative days until follow-up was  $22.6 \pm 8.42$ , cylindrical reading, dioptres were  $-1.13 \pm 0.94$ , spherical reading, dioptres were  $-0.12 \pm 3.68$ , no complications were 90.67%, while the most common complication in patients after surgery was posterior capsular tear and anterior capsular tear. In terms of visual acuity after surgery, Unaided was  $0.24 \pm 0.21$ , BCVA was  $0.08 \pm 0.19$ , Pinhole was  $0.12 \pm 0.14$ , and Best was  $0.09 \pm 0.14$ , Visual acuity variations include loss  $6/9 < VA < 6/24$  had 4 cases,  $6/24 < VA < 6/60$  had 2 cases,  $6/60 < VA$  had only one case, while gain had 68 cases. **Conclusion:** The study revealed that following surgery, visual acuity exhibited a notable improvement in patients with lens opacity. This observation has prompted questions regarding the efficacy of a 20/60 level for acuity enhancement.

**Keywords:** Cataract surgery, Cataracts, small incision, Quality of life scale, and Complications.

## Introduction

Cataracts continue to be the number one cause of blindness in the world and, in particular, in low-income countries, where it poses a major public health problem [1]. The World Health Organization report estimates that about 20 million people have bilateral blindness due to senile cataracts. Cataract is defined as the opacification of the lens. It is classified by its origin as congenital, metabolic, drug-induced, age-related, or traumatic. [2,3]

The greatest socio-economic impact is given by age-related cataracts and has a diverse pathogenesis [4]. Three types of senile cataracts are known according to the main location of opacity in the lens: nuclear, cortical, and posterior subcapsular. The senile cataracts, according to the degree of maturity are classified into: Immature cataract is one with partial opacification of the crystalline lens [5,3,6,7]. The cataract matures when the opacification of the lens is complete, and the hypermature when the

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anterior capsule is shrunken and wrinkled due to water leakage from the lens. Some medications with prolonged use can form cataracts; among these, we can mention corticosteroids, phenothiazines, miotics, amiodarone, and statins. [8]

Cataracts is one of the main causes of visual impairment, and 33% of people in the world experience a decrease in vision due to this disorder. Although the negative impact of cataracts is undeniable, the lack of a classification of the opacity of the lens makes it difficult to accurately establish the incidence and prevalence of this pathology. [9 – 10]

In our country, the prevalence of cataract blindness in people over 50 years of age is 2.1%; it is estimated that there are more than 80,000 people affected, a figure that increases by 16,000 new cases per year [11,12]. This is related to the current demographic transition situation facing Peru, which translates into an increase in life expectancy at birth and non-communicable diseases, coupled with the lack of universal insurance and the low rate of cataract surgeries nationwide. [13]

Cataract surgery currently has an excellent success rate in improving visual acuity. About 90% of otherwise healthy eyes achieve a better corrected visual acuity of 20/40 or better after surgery. If eyes with comorbid diseases are included, the rate is from 85% to 89%. [13,10,4,14]

Many large-scale reviewed studies on complications of cataract surgery present information from large or small incision extracapsular surgery or from procedures performed with phacoemulsification technology [15]. The most frequent intraoperative complication of phacoemulsification is the rupture of the posterior capsule [16]. The most common postoperative complications applying any technique include posterior capsule opacification, corneal edema (reported in 6.25% of cases), clinically significant cystoid macular edema (CME) (1.2% - 3.5% of cases), and residual cataract fragments (0.39% - 1.92% of cases) [17]. The incidence of retinal detachment in the first postoperative year is approximately 0.8%; that of endophthalmitis is 0.04% – 0.30%; and that of intraocular lens (IOL) dislocation to the vitreous chamber is 0.20% – 1.14%. [18]

## **Materials and Methods**

### **Study design**

The present study is of the cross-sectional type which covered databases of patients within 50 - 70 years. The population and sample consists of 75 patients who underwent cataract surgery with minimal incision at the different hospitals in Iraq between 4 April 2022 and 19 August 2023.

## **Inclusion and exclusion criteria**

### **- Criteria of inclusion**

Patients over 50 years of age operated with cataract surgery of minimal incision who have postoperative controls until at least two months after surgery.

### **- Exclusion criteria**

Patients with pre-existing eye diseases (corneal alteration, uveitis, glaucoma, and retinal alterations).

### **Procedure**

A review of the medical records of patients who underwent cataract surgery with cataract surgery technique between 4 April 2022 and 19 August 2023 will be made. The data will be extracted according to the data collection sheet: age, sex, comorbidities, preoperative visual acuity, degree of cataract, complications of surgery, and postoperative visual outcome at discharge.

### **Data collection**

Patients' data were enrolled from different hospitals in Iraq, where included 75 patients participants of this study. Our study was assessed all patients' data who conduct cataract surgery and analysis the quality of life and complications outcomes of patients.

### **Statistical analysis**

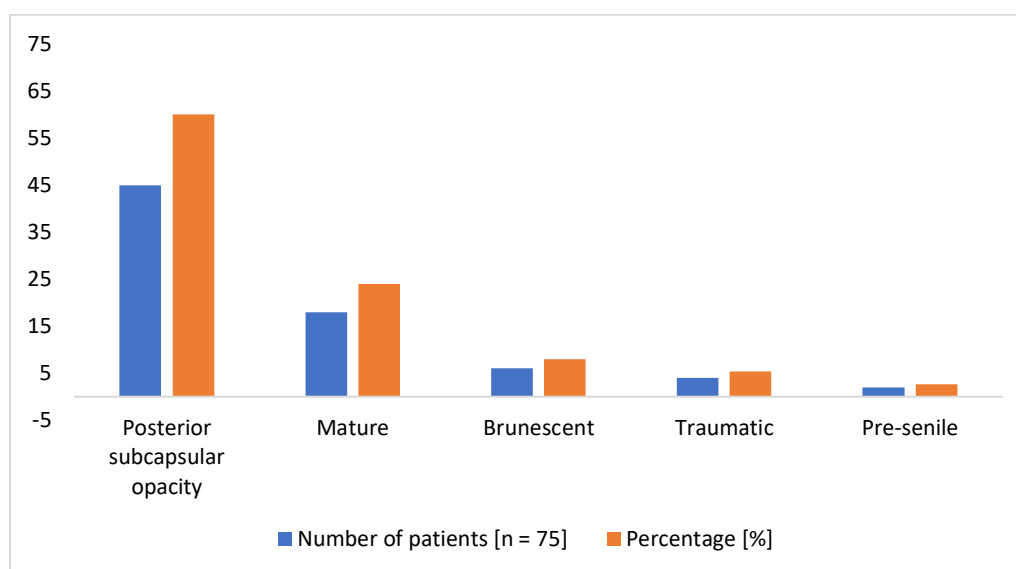
The qualitative variables will be reported using frequency distribution graphs, and the quantitative variables, the mean, median, and standard deviation, will be calculated. Clinical data of patients were designed and analysed by the SPSS program, version 22.0.

**Table 1:** Demographic and basic features of patients which observed in this study.

<b>Features</b>	<b>Number of patients [n = 75]</b>	<b>Percentage [%]</b>
<b>Age, years</b>		
50 – 65	36	48%
66 – 70	39	52%
<b>Sex</b>		
Male	45	60%

Female	30	40%
<b>BMI, Kg/m<sup>2</sup></b>		
Underweight	12	16%
Normal weight	3	4%
Overweight	24	32%
Obesity	36	48%
<b>Comorbidities</b>		
Hypertension	72	96%
Diabetes	36	48%
Anemia	12	16%
Kidney diseases	21	28%
Heart failure	18	24%
<b>Current smoking</b>		
Yes	20	26.67%
No	55	73.33%
<b>Previous surgery</b>		
Yes	32	42.67%
No	43	57.33%
<b>Education status</b>		
Primary school	8	10.67%

Secondary school	12	16.0%
University or college graduated	55	73.33%
<b>Working status</b>		
Yes	25	33.33%
No	50	66.67%



**Figure 2:** Distribution types of cataracts on patients.

**Table 2:** Surgical findings

Items	Number of patients [n = 75]	Percentage [%]
Operative time, min	15 – 30 minutes per eye	
Bleeding, n [%]		
Yes	0	0%
No	75	100%
Post-operative days until follow-up	22.6 ± 8.42	
Cylindrical reading, dioptries	- 1.13 ± 0.94	
Spherical reading, dioptries	- 0.12 ± 3.68	
<b>Complications</b>		
No complication	68	90.67%
Posterior capsular tear	2	2.67%
Anterior capsular tear	1	1.33%
Vitreous loss	0	0.00%

Unplanned vitrectomy	1	1.33%
Dropped nucleus	1	1.33%
Iris prolapses	0	0%
Iris trauma	0	0.00%
Hyphaema	0	0.00%
Zonular dialysis	0	0.00%

**Table 3:** Identify measurements of visual acuity before and after cataract surgery.

<i>Visual acuity (logMAR)</i>	<i>Preoperative</i>	<i>Postoperative</i>
<i>Unaided</i>	0.56 ± 0.32	0.24 ± 0.21
<i>BCVA</i>	0.34 ± 0.20	0.08 ± 0.19
<i>Pinhole</i>	0.18 ± 0.6	0.12 ± 0.14
<i>Best</i>	0.17 ± 0.8	0.09 ± 0.14

**Table 4:** Identify visual acuity variations findings.

<b>VA differences</b>	<b>Number of patients [n = 75]</b>	<b>Percentage [%]</b>
<b>Loss</b>		
6/9 < VA < 6/24	4	5.33%
6/24 < VA < 6/60	2	2.67%
6/60 < VA	1	1.33%
<b>Win</b>	68	90.67%

**Table 5:** Assessment of quality of life for patients in terms of pre and post-cataract surgery.

<i>Items</i>	<b>Preoperative</b>	<b>Postoperative</b>
<i>Physical function</i>	68.57 ± 9.42	84.92 ± 8.04
<i>Psychological function</i>	60.15 ± 4.91	94.28 ± 3.35
<i>Social and emotional functions</i>	72.73 ± 5.97	89.88 ± 5.58

*Daily activity*

67.69 ± 12.44

92.65 ± 5.31

## Results and Discussion

Abbé Desmonceaux was the first to suggest the idea for clear lens extraction of refractive reasons in 1776 [19]. Nowadays, the main objective in cataract surgery is to produce the best possible uncorrected eyesight after the procedure, rather than just removing the cataractous lens. This is due to improvements in the field. Also, the treatment has become safer overall thanks to recent technological advancements in surgical techniques as well as supplies, which motivates medical professionals and patients to choose surgery sooner rather than later. [20]

The decision to perform early cataract surgery can be guided by the desire to attain the best possible refractive post-operation and enhance contrast sensitivity and optical aberrations, which remain significant even as far as visualization using glasses is concerned but may not have any bearing on regular daily life situations [21,22]. Furthermore, second eye surgery could be done sooner than scheduled because there is anisometropia after one-eye operation.

Patients may also be offered the option of early cataract extraction alongside multifocal IOL implantation or clear lenses for treating presbyopia [23]. However, the results of cataract surgery may be adversely affected by intraoperative complications, which include posterior capsule rupture, zonular dehiscence, and iris trauma) or complications following the procedure, including variables posterior capsule opacification, cystoid macular oedema, or retinal detachment, particularly in long eyes). [24]

Visual aberrations such as halos, night glare, and starbursts can occur even in straightforward cataract surgery, especially with premium intraocular lenses, leading to dissatisfied patients at times. When thinking of the earliness of cataract surgery in such patients, at this stage, it is important to note the relationship between the cost and benefits such as functioning improvement, especially in an environment like the NHS where there are always rising needs which outstrip provision. [25]

According to our findings, there was a significant increase in visual acuity levels across all patients, with none having zero within the group, although post-surgery, at least 9.4% never attained their earlier pin-hole values. One preliminary research showed substantial enhancement of quality of vision among those undergoing lens removal operation who had ideal unaided eyesight. Yet no internal high dangers were found in the

study. Surprisingly it has been revealed by a recent Meta-analysis that preoperative visual acuity values did not correlate with outcomes of cataract surgery. Considering the visual improvement in post-operative patients in our sample group, it seems that using the 6/9 threshold to define the right candidates does not work accurately. [26]

As people get older, they may have other eye diseases such as glaucoma, age-related macular degeneration, and early cornea endothelium failure, which also induces early post-operative sight impairment. The mention of vitreous loss has a relationship with cataract surgery done early, after which some complications may arise, as well as subsequent poor outcomes in visual acuity. [27]

It is worth noting that a ruptured posterior capsule does not, on its own, lead to a decreased post-operative visual acuity. This really shows how important it is to handle this complication appropriately in order to avoid losing vitreous. Cytoplasm sperm injury also is linked to poor prognosis; potential reasons for this include high chances of post-op inflammation and increased frequencies of macular oedema post-op after this morbidity. [28]

### **Conclusion**

After surgery, visual acuity significantly increased among the subgroup of patients who had lens opacity, which raises the question on whether a level of 20/60 is a good measure for acuity enhancement through this treatment. Older age, vitreous loss, and iris trauma were related to poorer results, while those results did not seem to be influenced by posterior capsule rupture without loss of vitreous independently. Posterior capsule rupture may not result in vitreous loss, but it is possible that it can cause vitreous loss with zonular dehiscence. According to the results of our study, in the occurrence of vitreous loss, the pathological conditions leading to poorer visual acuity are the same irrespective of the cause of vitreous loss, whether association with posterior capsule rupture or zonular dehiscence. Therefore, one should not consider posterior capsule rupture without vitreous loss as a predictor of poor visual outcomes, according to our findings.

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