

## An Assessment of the Impact of Cataract Surgery on the Visual Acuity of Individuals with Diabetes: A Retrospective Study

Divya Kumari<sup>1</sup>, Arshad Iqbal<sup>2</sup>, Nageshwar Sharma<sup>3</sup>, Bibhuti Prassan Sinha<sup>4</sup>, Vijay Shankar<sup>5</sup>

<sup>1</sup>Senior Resident, Department of RIO, IGIMS, Patna, Bihar, India

<sup>2</sup>Senior Resident, Department of Ophthalmology, PMCH, Patna, Bihar, India

<sup>3</sup>Professor, Department of Ophthalmology, PMCH, Patna, Bihar, India

<sup>4</sup>Professor, Department of ROI, IGIMS, Patna, Bihar, India

<sup>5</sup>Associate professor, Department of Nephrology, NMCH, Patna, Bihar, India

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Corresponding Author: Dr. Arshad Iqbal

Conflict of interest: Nil

### Abstract

**Aim:** To evaluate the impact of cataract surgery on the visual acuity of individuals with diabetes.

**Material and Methods:** This study was conducted in the Department of RIO, IGIMS, Patna, Bihar, India for one year. A total of 100 study subjects who met the inclusion criteria were selected for the purpose of the study as cases and 100 cases were selected as controls who did not have any kind of comorbidities. All patients diagnosed with cataract and diabetes mellitus, Patients presenting with all types of cataracts i.e. Cortical, Nuclear, Sub capsular and Capsular and 100 non diabetic patients with cataract age matched as control were taken were included in this study.

**Results:** A total of 100 study subjects both in case and control group were selected and analysed. The Mean age of the Patients in Diabetic Group was 60.15 Years and in Control group it was 58.43 years of age. Nearly 48 % of them in Diabetic group were aged between 60 to 69 years of age and in the control group nearly 50 % of them were in the same age group in control group. Among Diabetic group nearly 59% of them were female and 41 % were male and in control group Female were 56% and Male were 44 %. In this study in diabetic group 15% had vision of light perception, 75% had vision from HM-6/60, 6% had vision of 6/36 and only 4% had vision of 6/24. In control 12% of the patients had vision of light perception, 77% had vision of HM6/60, 7% had vision of 6/36 and only 4% had 6/24. In this study, post-operative visual acuity in 8% of Diabetics and 2% of Control was < 6/60. 9% of Diabetics and 10% of Control was 6/36. 13% of Diabetics and 18% of Control was 6/24. 26% of Diabetics and 18% of Control was 6/18. 44% of Diabetics and 52% of Control was greater or equal to 6/12. The Association was found to be statistically non-significant.

**Conclusion:** The diabetic patients with cataract have an overall good visual out come. With adequate blood sugar control, careful preoperative planning, atraumatic surgical techniques, appropriate postoperative medicines and close postoperative supervision, diabetic patients can achieve excellent vision after cataract surgery just like our other cataract patients.

**Keywords:** Cataract surgery, Visual acuity, Diabetes

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### Introduction

Cataract surgery is one of the most commonly performed ophthalmic procedures, significantly improving visual acuity and quality of life for millions of patients worldwide. However, the outcomes of cataract surgery can be influenced by various factors, including systemic conditions such as diabetes mellitus. Diabetic patients are particularly vulnerable to complications that can affect visual outcomes due to the metabolic and vascular changes associated with the disease. In

recent years, numerous studies have explored the impact of cataract surgery on visual acuity among diabetic patients, providing insights into the effectiveness and challenges of this procedure in this specific population. Diabetes mellitus is associated with a higher prevalence of cataracts and an accelerated progression of lens opacity compared to non-diabetic individuals. Additionally, diabetic patients often present with other ocular comorbidities, such as diabetic retinopathy (DR) and

diabetic macular oedema (DME), which can complicate both the surgery and the postoperative recovery process. [1,2] The presence of these conditions can adversely affect visual acuity outcomes post-surgery, making it crucial to manage and monitor these patients closely before, during, and after the procedure. Despite the potential challenges, cataract surgery has been shown to significantly improve visual acuity in diabetic patients. Effective management of diabetes and its ocular manifestations is crucial for optimizing surgical outcomes. Preoperative assessment should include a thorough examination of the retina to identify and treat any existing DR or DME. Diabetic patients are at an increased risk for certain postoperative complications, such as cystoid macular oedema (CME) and delayed wound healing. Studies have reported a higher incidence of CME in diabetic patients, which can negatively impact the recovery of visual acuity. Recent advancements in cataract surgery techniques, such as the use of femtosecond laser-assisted cataract surgery (FLACS) and premium intraocular lenses (IOLs), have shown promise in improving outcomes for diabetic patients. FLACS, for instance, offers more precise incisions and reduced energy use, potentially leading to better postoperative outcomes. [3-9]

**Material and Methods**

This study was conducted in the Department of RIO, IGIMS, Patna, Bihar, India for one year. A total of 100 study subjects who met the inclusion criteria were selected for the purpose of the study as cases and 100 cases were selected as controls who did not have any kind of comorbidities.

**Inclusion criteria**

- All patients diagnosed with cataract and diabetes mellitus.
- Patients presenting with all types of cataracts i.e. Cortical, Nuclear, Sub capsular and Capsular.
- 100 non diabetic patients with cataract age matched as control were taken

**Exclusion Criteria**

- Previous ocular trauma, subluxation of the cataractous lens.
- Previous intraocular surgery.
- Previous intraocular laser treatment.
- Patients with complicated cataract and anterior uveitis.
- Patients with uncontrolled hypertension.
- Patients below the age of 18 years.
- Patients with glaucoma

All cases underwent manual small incision cataract surgery done by consultant ophthalmologist. All cases were done under local peribulbar anaesthesia and followed up at the end of six months. Descriptive statistics such as mean, SD and percentage was used to present the data. Comparison between control and diabetic groups was done using chi-square test for qualitative data and t-test for quantitative data. A p-value less than 0.05 was considered as significant. Data was analysed by using software SPSS v21.

**Results**

A total of 100 study subjects both in case and control group were selected and analysed. The Mean age of the Patients in Diabetic Group was 60.15 Years and in Control group it was 58.43 years of age. Nearly 48 % of them in Diabetic group were aged between 60 to 69 years of age and in the control group nearly 50 % of them were in the same age group in control group. Among Diabetic group nearly 59% of them were female and 41 % were male and in control group Female were 56% and Male were 44 %. In this study in diabetic group 15% had vision of light perception, 75% had vision from HM-6/60, 6% had vision of 6/36 and only 4% had vision of 6/24. In control 12% of the patients had vision of light perception, 77% had vision of HM6/60, 7% had vision of 6/36 and only 4% had 6/24. In this study, post-operative visual acuity in 8% of Diabetics and 2% of Control was < 6/60. 9% of Diabetics and 10% of Control was 6/36. 13% of Diabetics and 18% of Control was 6/24. 26% of Diabetics and 18% of Control was 6/18. 44% of Diabetics and 52% of Control was greater or equal to 6/12. The Association was found to be statistically non-significant.

**Table 1: Social Profile of the study participants**

Profile	Diabetic		Non- diabetic		
	Frequency	%	Frequency	%	
Age Group	< 50Years	12	12 %	7	7 %
	50- 59 Years	30	30 %	28	28 %
	60-69 years	48	48 %	50	50 %
	>70 Years	10	10 %	15	15 %
Gender	Male	41	41 %	44	44 %
	Female	59	59 %	56	56%
Mean Age	60.15± 8.32		58.43 ± 7.78		

**Table 2: Pre-Operative Visual Acuity in Diabetic and Control group**

Visual Acuity	Diabetic		Non-Diabetic	
	Frequency	%	Frequency	%
PL + or PR+	15	15 %	12	12 %
HM to 6/60	75	75 %	77	77 %
6/36	6	6 %	7	7 %
6/24	4	4 %	4	4 %

**Table 3: Post-Operative Visual Acuity in Diabetics and Control at 6 Month**

Visual Acuity	Diabetic		Non Diabetic	
	Frequency	%	Frequency	%
<6/60	8	8 %	2	2 %
6/36	9	9 %	10	10 %
6/24	13	13 %	18	18 %
6/18	26	26 %	18	18 %
>6/12	44	44 %	50	50 %

### Discussion

In this study, highest number of patients were in the age group of 60-64 years that is 35% in diabetics and 29% in control. 10% in diabetics and 15% of the non-diabetic patients were above 70 years. Remaining 42% of the patients in diabetics and 35% of the patients in control were below 60 years. The mean age group of the patients in diabetic group was  $58.43 \pm 7.78$  yrs. and  $60.15 \pm 8.32$  yrs. in control group. The Framingham and other eye studies indicate a 3-4 fold increased prevalence of cataract in patients with diabetes under 65 and up to a twofold excess prevalence in patients above age group. [9,10] In this study, in diabetic group 59% were female and 41% were male. In control 44% were male and 56% were female. This coincides with the fact that prevalence of cataract itself is more common in females than males. In the Framingham eye study also senile lens changes were more common in women. [11] In this study majority of the patients had poor pre-operative visual acuity. 15% of the diabetic and 12% of the control patients had vision of PL PR, 75% of the diabetics and 77% of the control had visual acuity ranging from HM to 6/60. 6% of the diabetic and 7% of the control had vision of 6/36. Only 4% of diabetic and control patients in this study had vision of 6/24. In this study, visual acuity at the end of 6 month showed, 8% of the diabetic and 2% of the control patients had vision < 6/60. 9% in diabetics and 10% in control had vision of 6/36, 13% of the diabetics and 18% of the control had a vision of 6/24, 26% of the diabetics and 18% of the control had a vision of 6/18. 44% of the diabetics and 52% of the control had a vision of greater or equal to 6/12. No statistically significant difference was found in this study between the 2 groups with a p-value=0.28(p>0.05). Similar observations were made in the following studies. Study by Onakpoya H Oluwatoyin et al. has shown that there is no statistically significant difference in visual acuity outcome in diabetic and control group.

[5] Study by N D George, et al. showed that there was no statistically significant difference in visual outcome between control and diabetic group without retinopathy. This study also showed significantly poor visual acuity outcome in diabetics with retinopathy compared to control group. The cause of poor visual acuity outcome in diabetic group was CSME, CMO, grade IV PCO. The cause of poor visual acuity outcome in patients in control group was age related macular degeneration, macular scar and optic atrophy. [8]

### Conclusion

The diabetic patients with cataract have an overall good visual outcome. With adequate blood sugar control, careful preoperative planning, atraumatic surgical techniques, appropriate postoperative medicines and close postoperative supervision, diabetic patients can achieve excellent vision after cataract surgery just like our other cataract patients. With adequate blood sugar control, careful preoperative planning, atraumatic surgical techniques, appropriate postoperative medicines and close postoperative supervision, diabetic patients can achieve excellent vision after cataract surgery just like our other cataract patients.

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