RJNMSR
Review Journal of Neurological & Medical Sciences Review

Volume 4, Issue 1, 2026

COMPARISON OF VISUAL OUTCOMES AFTER CATARACT SURGERY IN DIABETIC VS NON-DIABETIC PATIENTS IN SHEIKH ZAYED HOSPITAL, RAHIM YAR KHAN

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DOI: https://doi.org/10.5281/zenodo.18296394

Received	Accepted	Published
24 November 2025	05 January 2026	19 January 2026

ABSTRACT

This comparative observational study evaluated visual outcomes following cataract surgery in diabetic and non-diabetic patients at Sheikh Zayed Hospital, Rahim Yar Khan. A total of 100 patients were enrolled, equally divided into diabetic and non-diabetic groups, and assessed preoperatively and postoperatively at Day 1, Week 1, and Week 6. Visual acuity, complications, retinal status, and patient satisfaction were analyzed. Both groups demonstrated significant improvement in best-corrected visual acuity, with 71% reporting improved or much-improved vision. Early postoperative complications such as mild corneal edema were common but resolved by six weeks, while posterior capsular opacification occurred in 35% of cases. Statistical analysis revealed no significant difference in visual improvement between diabetic and non-diabetic patients ($\chi^2 = 4.848$, $p = 0.303$). Overall, cataract surgery was safe and effective in both groups, with high patient satisfaction, provided adequate preoperative evaluation and glycemic control were ensured.

Keywords: *Cataract surgery, Diabetes mellitus, Visual outcomes, Postoperative complications*

INTRODUCTION

Diabetes mellitus, or DM, is a chronic, systemic metabolic disease that causes abnormalities in insulin action, synthesis, or both that lead to elevated blood sugar levels. The Latin word mellitus, which means sweet, and the Greek word diabetes, which means siphon, which means to pass through, are the sources of the term diabetes mellitus. Numerous organ systems are impacted by diabetes, a complex and progressive condition that has been connected to a variety of microvascular and macrovascular issues. In recent decades, diabetes has become a significant and quickly expanding global public health concern. Demographic shifts, increased urbanization, less physical activity, and dietary changes are all major contributors to its rising incidence.

Background

According to estimates from the International Diabetes Federation, 463 million people

worldwide had diabetes in 2019. This number is predicted to increase to 700 million by 2045 if current research continues, which is unacceptable. Particularly in countries with middle-class and lower-class populations, these growing responsibilities pose serious health and financial challenges. Pakistan is one of the countries where the prevalence of diabetes is sharply rising, and a rising proportion of people have diabetes-related problems, such as visual impairment symptoms. The substantial increase in the prevalence of diabetes and consequences calls for prompt attention to both effective therapeutic intervention and prevention measures. There are two forms of diabetes. Type I is caused by autoimmune beta-cell loss in the pancreas and leads to total insulin deficiency. Type 1 diabetes mellitus is the second most common chronic illness and endocrine-metabolic issue in children. Diabetes patients' cataract development is caused by a variety of complex mechanisms, including oxidative stress, metabolic processes, inflammation, and ocular surface channels. Diabetic cataract (DC) has been found to be the most common cause of blindness and visual impairment among the several issues brought on by diabetes. Over 51% of all occurrences of blindness worldwide are caused by cataracts, making them the leading cause. Compared to people without diabetes, diabetics are much more likely to get cataracts. Patients with diabetes not only develop cataracts at a younger age, but they also develop them faster, severely impairing their vision much earlier. Diabetes-related visual impairment frequently results in decreased independence, a higher risk of falls, depressive symptoms, and social isolation, necessitating thorough rehabilitation assistance. People with diabetes who have had cataract surgery often Dry eye issues following surgery. Damage to the endothelium following surgery results in increased corneal thickness and opacity, which hinders visual recovery.

Study Objectives and Methodology

This study examines the visual results following cataract surgery at Sheikh Zayed Hospital in Rahim Yar Khan in patients with and without diabetes. Rahim Yar Khan's Sheikh Zayed Hospital served as the site of this comparative observational study. Patients undergoing cataract surgery provided preoperative, intraoperative, and postoperative data using a structured questionnaire and clinical assessment proforma. Patients with and without diabetes made up the two groups of participants. Medical history, eye examination, and patient awareness and knowledge assessment were all part of the preoperative evaluation. In order to evaluate visual acuity outcomes, complications, retinal state, and patient satisfaction, postoperative follow-ups were performed at Day 1, Week 1, and Week 6. To identify differences between the two groups, data were examined using the relevant statistical tests.

Key Findings

Table 1: Key Findings on visual outcomes among diabetic and non-diabetic patients

Diabetes Status * Compared to before surgery, how would you rate your vision? Crosstabulation

		Compared to before surgery, how would you rate your vision?					Total
		Worse	Fair	Good	Improved	Much improved	
Diabetes Status	Non-Diabetic	1	1	9	29	10	50
	Diabetic	0	4	14	22	10	50
Total		1	5	23	51	20	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.848[a]	4	.303

Likelihood Ratio	5.373	4	.251
Linear-by-Linear Association	.912	1	.339
N of Valid Cases	100		

The study had 100 patients, 51% of whom were female and 49% of whom were male. The majority of patients (44%) were between the ages of 56 and 65, followed by those between the ages of 46 and 55 (27%) and 66 and 75 (17%). This indicates that cataract surgery is more common among older people. The individuals were split evenly into groups with and without diabetes. 47% of patients had hypertension, and 99% said they had never had eye surgery before. Oral hypoglycemic medications were the most commonly utilized treatment among individuals with diabetes mellitus (56%), followed by insulin therapy (32%) and oral and insulin therapy combined (12%). Both the right and left eyes had cataract surgery on an equal basis. With 33% of patients presenting with counting fingers vision and 16% with hand movements, preoperative best-corrected visual acuity was significantly lowered. In terms of lens condition, 16% of patients had hypermature cataracts and 74% had mature cataracts. 92% of patients had normal fundus examination results, but a tiny percentage had alterations indicative of diabetic retinopathy.

Patient awareness and understanding regarding cataract and its management are outlined in Table 4.3. Just 22% of diabetic patients knew that diabetes and cataract development are related, whereas the majority (78%) did not. 49% of participants assessed their overall comprehension of cataract surgery as good, 38% as fair, and 13% as exceptional. On the first postoperative day, best-corrected visual acuity significantly improved, with 38% of patients attaining 6/9 vision and 26% attaining 6/12 vision. According to a subjective evaluation, 71% of patients thought their vision had improved or much improved. 48% of patients had corneal edema, most of which were mild to moderate in intensity. Three percent of individuals had endophthalmitis, and there was no anterior chamber reaction. Findings at the one-week postoperative follow-up are shown in both a significant decrease in corneal edema and ongoing improvement in visual acuity were seen. No incidences of endophthalmitis were reported, and 70% of patients showed full clearance of corneal edema. With 71% of patients reporting improved or significantly improved vision, subjective visual improvement remained strong.

Outcomes at six weeks postoperatively are presented that all patients showed full recovery of corneal edema and anterior chamber response, and visual acuity outcomes remained steady. Best-corrected visual acuity showed consistent improvement. In 35% of patients, posterior capsular opacification was found. There was no evidence of diabetic retinopathy progression. In 10% of patients, macular edema developed, while in 90% of patients, macular status remained normal. In total, 72% of patients said they were happy or extremely happy with the surgery outcomes. Total 37% of patients experienced persistent postoperative problems, with glare (14%) and dry eye (23%) being the most prevalent. Prior to surgery, all patients confirmed referral for diabetic retinopathy screening and acknowledged the significance of routine ocular follow-up. Of patients with diabetes, 38% were unsure and 54% thought that their condition affected their ability to recover after surgery. Every participant agreed or strongly agreed that maintaining adequate glycemic control is essential to avoiding eye problems. Among diabetic patients, therapy costs (38%), ignorance (26%), and inadequate glycemic control (26%) were obstacles to preserving ideal vision. Patients with and without diabetes had similar postoperative visual results, according to the research, which showed no statistically significant correlation between diabetes status and visual improvement ($\chi^2 = 4.848$, $p = 0.303$).

Discussion

The present study was conducted to evaluate visual outcomes and postoperative complications following cataract surgery, with particular emphasis on the influence of diabetes mellitus on surgical recovery and patient satisfaction. The findings of this study are discussed in the context of existing literature and current clinical understanding of cataract surgery outcomes in both diabetic and non-diabetic populations. With 51% of the sample population

being female, the demographic profile showed a slight female predominance. This result is in line with regional and global research showing a higher incidence of cataract in women, which may be related to hormonal impacts and longer life expectancy. The bulk of patients were between the ages of 56 and 65, highlighting the well-established finding in ophthalmic research that growing older is a significant risk factor for cataract development.

A fair comparison between patients with and without diabetes was made possible by the fact that half of the study sample had diabetes mellitus. 47% of patients had hypertension, which is indicative of the prevalence of systemic comorbidities in older patients having cataract surgery. Potential confounding effects on postoperative outcomes were minimized because only 1% of individuals reported having had prior eye surgery. Oral hypoglycemic medications were the most popular treatment option for diabetic patients, followed by insulin therapy and combination regimens. The way diabetes is typically managed in developing nations is reflected in this trend. Despite this, only 22% of diabetic patients were aware of the connection between diabetes and cataract development, underscoring the need for better patient education and counseling.

A significant percentage of patients had significantly impaired vision, including counting fingers and hand movements, according to preoperative best-corrected visual acuity results. The prevalence of mature cataracts also points to delayed surgical intervention presentation, which is a prevalent problem in settings with low resources because of accessibility and socioeconomic limitations. For most patients, the results of the fundus examination were normal. A small percentage of cases had diabetic retinopathy, both proliferative and non-proliferative types, which is in line with previously documented incidence rates among diabetic patients seeking cataract surgery.

As early as the first postoperative day, postoperative visual outcomes showed notable improvement; at one week and six weeks, more stabilization and augmentation were noted. Positive surgical outcomes were demonstrated by the significant percentage of patients who attained best-corrected visual acuity of 6/9 or higher. These results were supported by a subjective evaluation of vision, with the majority of patients reporting improved or significantly improved eyesight over the course of the follow-up period. These findings are consistent with previous research showing that, when systemic and ocular diseases are well controlled, both diabetic and non-diabetic patients can successfully recover their vision after cataract surgery.

There were few and mostly minor early postoperative problems. A small proportion of patients experienced corneal edema, which went away by the six-week follow-up. At no point was there a documented anterior chamber reaction, indicating acceptable surgical technique and successful postoperative care. 35% of patients had posterior capsular opacification, which is similar to the incidence found in other studies of a similar nature. Only a small number of patients experienced endophthalmitis on the first postoperative day, and it was absent in later follow-ups, suggesting that infection control methods were adequate.

During the follow-up period, there was no evidence of diabetic retinopathy progression. This result could be explained by the comparatively brief follow-up period, preoperative retinal screening, and proper perioperative care. Diabetes mellitus did not negatively impact early visual outcomes in this cohort, according to statistical analysis, which found no significant correlation between diabetes status and postoperative visual improvement. These results are in line with research showing that when glycemic control and retinal health are maximized before surgery, individuals with diabetes and those without the disease have similar postoperative outcomes. Despite the lack of clear clinical differences, a significant percentage of diabetic patients believed that their recovery was impacted by their condition, indicating a subjective effect.

The majority of patients expressed satisfaction or high satisfaction with surgical results, indicating a high level of overall patient satisfaction. A small percentage of patients had persistent postoperative symptoms like glare and dry eye, which are known to be frequent aftereffects of cataract surgery. Interestingly, every participant recognized the value of routine ocular follow-up, diabetic retinopathy screening, and postoperative counseling, demonstrating good patient-physician understanding and communication. These results highlight how crucial thorough perioperative care and patient

education are to improving surgical results and satisfaction.

Recommendations

The following suggestions are put forth in light of the study's findings:

1. As long as a comprehensive preoperative evaluation and sufficient glycemic control are attained, cataract surgery shouldn't be delayed purely because of diabetes mellitus.
2. Before cataract surgery, all diabetic patients should have routine screening for diabetic retinopathy in order to detect and treat retinal pathology.
3. To raise knowledge of diabetes-related ocular problems and the significance of routine ophthalmic follow-up, patient education programs should be reinforced.
4. To further evaluate long-term surgery outcomes, future research should include bigger sample numbers, longer follow-up periods, and objective glycemic control measures.
5. To maximize perioperative care for patients with diabetes, multidisciplinary cooperation between ophthalmologists, doctors, and endocrinologists should be promoted.

Limitations

Despite the study's significant conclusions, a number of limitations should be noted. The results may not be as generalizable to a larger population due to the very small sample size. Furthermore, the evaluation of long-term visual outcomes, such as the development of posterior capsular opacification and the incidence of late-onset postoperative problems, was limited by the brief follow-up period.

Moreover, the analysis did not include objective glycemic control metrics like glycated hemoglobin (HbA1c) levels. A more thorough knowledge of the connection between glycemic control and postoperative visual outcomes might have been possible with the inclusion of these measures. Additionally, the study used self-reported patient replies, which could be biased by subjectivity and recollection.

Conclusion

According to the study's findings, both diabetic and non-diabetic patients who have cataract surgery report significantly improved visual acuity and visual happiness. As early as the first postoperative day, most subjects showed significant visual recovery; at one-week and six-week follow-up visits, further stabilization and improvement were noted. Chi-square analysis supports the results, which show that diabetes mellitus had no statistically significant effect on early postoperative visual outcomes. Patients with diabetes can obtain visual outcomes similar to those of non-diabetic people with careful perioperative and postoperative care, as well as appropriate preoperative examination, including diabetic retinopathy screening. Mild ocular edema was the most often reported early complication, while postoperative problems were rare and mostly temporary. During the follow-up period, there was no evidence of diabetic retinopathy progression. The overall high level of patient satisfaction with surgical results highlights the clinical benefit, safety, and efficacy of cataract surgery in both diabetic and non-diabetic groups.

REFERENCES

Zhang X, Peng L, Dai Y, Xie Q, Wu P, Chen M, et al. Anti-cataract effects of coconut water in vivo and in vitro. Biomed Pharmacother[Internet].2021;143(September) :112032.Availablefrom:https://doi.org/10.10 16/j.biopha.2021.112032

Sapra A, Bhandari P. Diabetes. StatPearls. 2025.

Li J, Sun Q, Qiu X, Zhang J, Zheng Y, Luo L, et al. Downregulation of AMPK dependent FOXO3 and TFEB involves in the inhibition of autophagy in diabetic cataract. Curr Eye Res [Internet].2022;47(4):555–64.Availablefrom:https://doi.org/10.1080/0 2713683.2021.2009516

Chan LKY, Lin SS, Chan F, Ng DSC. Optimizing treatment for diabetic macular edema during cataract surgery. Front Endocrinol (Lausanne). 2023;14(January):1–10.

Mrugacz M, Pony-Uram M, Bryl A, Zorena K. Current Approach to the Pathogenesis of Diabetic Cataracts. Int J Mol Sci. 2023;24(7):1–14.

Ojo OA, Ibrahim HS, Rotimi DE, Ogunlakin AD, Ojo AB. Diabetes mellitus: From molecular mechanism to pathophysiology and pharmacology. Med Nov Technol Devices. 2023;19(June):100247.

Bigaran LT, Pereira FRS, Maia AK da S, Barbosa TC, Ribeiro E dos SLP, Lima RE de A, et al. Diabetes Mellitus tipo 1: Uma revisão de literatura sobre o impacto da doença na qualidade de vida de crianças. Res Soc Dev. 2022;11(15):e236111536947.

Guo Z, Ma X, Zhang RX, Yan H. Oxidative stress, epigenetic regulation and pathological processes of lens epithelial cells underlying diabetic cataract. Adv Ophthalmol Pract Res [Internet]. 2023;3(4):180–6. Available from: https://doi.org/10.1016/j.aopr.2023.10.001

López Sánchez GF, Smith L, Jacob L, Shin J Il, Koyanagi A, Pardhan S. Gender Differences in the Association Between Cataract and Mental Health in Adults With Diabetes: A Cross-Sectional Analysis From the Spanish National Health Survey 2017. Front Public Heal. 2021;9(December):1–7.

Liao N, Chen J, Hu W, Shi H, Liu S, Zhang Z, et al. Risk Factors for Sarcopenia in Women with Type 2 Diabetes and the Effects of Metformin : A Cross-Sectional Study of 7 , 731 Patients from the UK Biobank. 2025;(November):4529–40.

Fallico M, Avitabile T, Castellino N, Longo A, Russo A, Bonfiglio V, et al. Intravitreal dexamethasone implant one month before versus concomitant with cataract surgery in patients with diabetic macular oedema: the dexcat study. Acta Ophthalmol. 2021;99(1):e74–80.

Zhang K, Zhang S, Yu J, Lu Y, Zhu X. Changes of the tear film lipid layer thickness after cataract surgery in patients with diabetes mellitus. Acta Ophthalmol. 2021;99(2):e202–8.

Kudva A, Lasrado A, Hegde S, Kadri R, Devika P, Shetty A. Corneal endothelial cell changes in diabetics versus age group matched nondiabetics after manual small incision cataract surgery. Indian J Ophthalmol [Internet]. 2020;68(1):72. Availablefrom:https://journals.lww.com/ijo/Fulltext/2020/68010/Corneal_endothelial_cell_changes_in_diabetics.19.aspx

Furino C, Boscia F, Niro A, D'Addario M, Grassi MO, Saglimbene V, et al. DIABETIC MACULAR EDEMA AND CATARACT SURGERY: Phacoemulsification Combined With Dexamethasone Intravitreal Implant ComparedWithStandardPhacoemulsification. Retina. 2021 May;41(5):1102–9.

Rahman O, Kumar S. European Journal of Cardiovascular Medicine (EJCM) A Study on the Visual Outcomes of Cataract Surgery in Diabetic Patients and Assessment of Post-operative Complications Compared to Non-Diabetic Patients . 2025;(02):183–9.

Singh N, Pai SG, John TA. Evaluation of Visual Outcomes of Cataract Surgery in Diabetic Patients and Assessment of Post-operative Complications as Compared to Non-diabetics. 2019;13(3):10–4.

Bansal A, Bansal M. A COMPARATIVE STUDY OF CATARACT SURGERY IN DIABETIC AND NON-DIABETIC PATIENTS. 2022;652–5.

Arslan G, Erdaş ÇB. Detection Of Cataract, Diabetic Retinopathy and Glaucoma Eye Diseases with Deep Learning Approach. Intell Methods Eng Sci. 2023;2(2):42–7.

Nangia V, Jonas JB, Sinha A, Gupta R, Agarwal S. Visual Acuity and Associated Factors . The Central India Eye and Medical Study. 2011;6(7):1–8.

Hospital MS. Impact of Diabetes on Visual Acuity and Its Association with Blood Glucose Levels in Diabetic Patients Attending Murtala. 2024;10(1):169–76.

Kumar R, Rehman S, Baloch GM, Vankwani M, Somrongthong R. Effectiveness of health education intervention on diabetes mellitus among the teachers working in public sector schools of Pakistan. BMC Endocr Disord [Internet]. 2022;10–5. Available from: https://doi.org/10.1186/s12902-022-01110-7

Shaikh AR, Mirani AH. Visual outcome after phacoemulsification with lens implant in diabetic and non-diabetic patients ; A comparative study. 2017;1–4.

Syaripudin A, Karningsih, Supardi A, Dahbul NA, Rondonuwu RHS. Diabetes Melitus and Lifestyle Patterns in Society: A Comprehensive Literature Review. Int J Sci Soc. 2023 Aug;5(3):310–22.

Pék A, Szabó D, Sándor GL, Tóth G, Papp A, Nagy ZZ, et al. Relationship between diabetes mellitus and cataract in Hungary. Int J Ophthalmol. 2020;13(5):788–93.

Alsayed AO, Ismail NA, Hasan L, Syed AH, Embarak F, Da'u A. A systematic literature review for understanding the effectiveness of advanced techniques in diabetes self-care management. Alexandria Eng J. 2023;79(August):274–95.

Richardson RB, Ainsbury EA, Prescott CR, Lovicu FJ. Etiology of posterior subcapsular cataracts based on a review of risk factors including aging, diabetes, and ionizing radiation. Int J Radiat Biol. 2020;96(11):1339–61.

Khamkar SG, Barkade GD. Review on Cataract. Indian J Cataract Refract Surg. 2024;1(2):112–24.

Lu WL, Shen PC, Lee CH, Su YT, Chen LM. High Risk of Early Cataracts in Young Type 1 Diabetes Group: A Nationwide Cohort Study. Int J Endocrinol. 2020;2020.

Enl Chinasa Godsgift, and ,Orec10us Ojo Uahomo_ 2024 "The Effects ofExcesswe Use of Computer Screen on Visual Acuity Among Non-Academic University Staff. Ophthalmology Research: An International Journal19https://doi.org/10_9734/or/2024/v19i5439

Nagaya M, Yamaoka R, Kanada F, Sawa T, Takashima M, Takamura Y, et al. Histone acetyltransferase inhibition reverses opacity in rat galactose-induced cataract. PLoS One [Internet]. 2022;17(11 November):1–20. Availablefrom:http://dx.doi.org/10.1371/journal.pone.0273868

Yong GY, Mohamed-Noor J, Salowi MA, Adnan TH, Zahari M. Risk factors affecting cataract surgery outcome: The Malaysian cataract surgery registry. PLoS One [Internet]. 2022;17(9 September):1–11. Availablefrom:http://dx.doi.org/10.1371/journal.pone.0274939

Panozzo G, Staurenghi G, Dalla Mura G, Giannarelli D, Alessio G, Alongi S, et al. Prevalence of diabetes and diabetic macular edema in patients undergoing senile cataract surgery in Italy: The DIabetes and CATaract study. Eur J Ophthalmol. 2020;30(2):315–20.

Tham YC, Liu L, Rim TH, Zhang L, Majithia S, Chee ML, et al. Association of Cataract Surgery with Risk of Diabetic Retinopathy among Asian Participants in the Singapore Epidemiology of Eye Diseases Study. JAMA Netw Open. 2020;3(6):E208035.

Hatipoglu B, Pronovost PJ. Role of Diabetes Self-management Education for Our Health Systems and Economy. J Clin Endocrinol Metab [Internet]. 2025;(December 2024):91–9.Availablefrom:https://doi.org/10.1210/clinem/dgae913

Glassman AR, Elmasry MA, Baskin DE, Brigell M, Chong V, Davis Q, et al. Visual Function Measurements in Eyes With Diabetic Retinopathy : An Expert Opinion on Available Measures. Ophthalmol Sci [Internet]. 2024;4(5):100519. Available from:https://doi.org/10.1016/j.xops.2024.100519

Chindy M, Marheni D, Wahyuni I, Mega D, Farid ZM, Kloping NA. The safety and Efficacy of Phacoemulsification in Diabetic Versus Non-Diabetic Patients : A Systematic Review and Meta-Analysis. 2025;41(2):197–208.

Fazeenah A. A literary review on visual acuity. 2021;(July).

Montori B, Teresa P, Vilella M, Estela L, Pan X, Ort M, et al. Comparison between Different Visual Acuity Tests and Validation of a Digital Device. 2024;1–9.

Jong PTVM De. A history of visual acuity testing and optotypes. 2024;(July 2022).

Prokofyeva E, Wegener A, Zrenner E. Cataract prevalence and prevention in Europe: A literature review. Acta Ophthalmol. 2013;91(5):395–405.

Gao C, Liu X, Fan F, Yang JN, Zhou XY, Mei HJ, et al. Exosomal miR-29b found in aqueous humour mediates calcium signaling in diabetic patients with cataract. Int J Ophthalmol. 2021;14(10):1484–91.