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Original Research Article

A Retrospective Analysis of Outcomes in Patients Undergoing Phacoemulsification Surgery, Including Visual Acuity, Complications, and Patient Satisfaction

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Abstract

Background: Cataract is one of the major causes of reversible blindness in the world, especially in developing nations such as India. Phacoemulsification has become the gold standard surgical procedure because it is safe, has a quick recovery and better visual results.

Methods: This retrospective observational study involved 98 patients who had phacoemulsification surgery from August 2023 to November 2025. Medical records were used in data collection, which included demographic information, preoperative and postoperative visual acuity, intraoperative and postoperative complications, and patient satisfaction levels. Descriptive and comparative statistical analysis was done with a significance level of $p < 0.05$.

Findings: Visual acuity improved significantly after surgery, and 68.4% of patients were found to have a visual acuity of between 6/6 and 6/12, as opposed to only 8.2% before the surgery. The percentage of patients who were severely visually impaired (<6/60) has dropped from 61.2% % to 7.1%. The intraoperative problems were also minimal, as rupture of the posterior capsule happened in 4.1% of the cases. The rate of postoperative complications was low but corneal edema was the most frequent (8.2%), and there were no instances of endophthalmitis. Patient satisfaction was high and 73.5% of the patients were highly satisfied.

Conclusion: Phacoemulsification surgery is a safe and effective surgery with high visual outcomes, low levels of complications and high levels of patient satisfaction. More prospective research on bigger samples and extended follow-up is suggested.

Keywords: Phacoemulsification, Cataract Surgery, Visual Acuity, Surgical Complications, Patient Satisfaction, Retrospective Study.

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Introduction

Cataract is among the causes of preventable blindness in the world, which causes a considerable number of visual impairments, especially in the low and middle-income nations, including India [1]. Cataract-related blindness is particularly prevalent in rural and underserved areas, which might have limited access to timely treatment through surgery [2]. Cataract contributes a significant percentage of cases of blindness in India, thus becoming a significant health challenge to the public [3].

As life expectancy increases, and the population grows older, cataract prevalence is on the increase, making it essential to have effective, safe and accessible surgical management strategies [4]. Cataract surgery has experienced great developments over the decades with the changes in the intracapsular and extracapsular methods of removal and the contemporary small incision methods [5]. Phacoemulsification has become the standard of cataract surgery among these because of its minimally invasive nature, quick visual recovery, and fewer postoperative complications. The method involves the use of ultrasonic energy to emulsify the opacified lens and then intraocular lens is implanted which enables quick recovery and better patient outcomes as compared to traditional procedures [6,7]. Its universal usage has greatly enhanced the quality of cataract care in the world.

The assessment of surgical results in phacoemulsification is complex and goes beyond anatomical success. The most important indicator of the effectiveness of the surgery is the visual

acuity, which shows the degree of visual recovery postoperatively [8]. The evaluation of intraoperative and postoperative complications is equally significant as these are vital parameters reflecting safety and quality of care in surgery [9,10]. Moreover, patient-reported satisfaction has become more important in recent years because it is a subjective experience, expectation, and quality of life improvement after surgery, thus offering a more comprehensive gauge of success.

Although considerable literature exists on the results of phacoemulsification, there is a relative lack of region-specific data, especially in semi-urban and rural locations in states such as Bihar. The difference in patient demographics, healthcare infrastructure and surgical expertise would require localized researches in order to gain insights into outcomes in such settings. These data are critical in enhancing clinical practices and health care policies at the regional levels.

Thus, the current study aims to retrospectively examine the visual outcomes, complications, and patient satisfaction in patients who have undergone phacoemulsification surgery at JNKT Medical College and Hospital, Madhepura.

Objectives of the Study

- To determine the visual acuity improvement after a phacoemulsification surgery among patients operated in JNKT Medical College & Hospital, Madhepura.
- To determine the rates and types of intraoperative complications of phacoemulsification surgery.
- To determine the frequency and nature of postoperative complications.

Materials and Methods

Study Design: The current research was a retrospective observational study that was meant to assess the outcome of patients undergoing phacoemulsification surgery. The analysis of existing patient records during a specific time was selected as a retrospective approach to assess the actual clinical outcomes in the absence of interventions.

Study Setting: The research was carried out in the JNKT Medical College & Hospital, Madhepura, a tertiary care teaching hospital, which serves a wide range of patients including both urban and rural populations. The facility offers all-around ophthalmic care, including more sophisticated cataract surgeries like phacoemulsification.

Study Duration: The cases covered in the study were done over a period from August 2023 to November 2025. This duration would enable the incorporation of adequate patient data and follow-up records that are required to determine the outcomes.

Sample Size: The study involved 98 patients who had phacoemulsification surgery within the study period. The sample size was identified on the basis of the availability of complete and fit patient records.

Inclusion Criteria: The inclusion criteria were patients who were operated upon in phacoemulsification surgery at the study center, aged 40 years or older, and complete medical records, including preoperative and postoperative data that could be analyzed.

Exclusion Criteria: The study excluded patients with traumatic cataracts, who received combined cataract surgeries and phacoemulsification and those with incomplete follow-up data or without important clinical data to achieve uniformity and reliability of the data.

Data Collection: The data was gathered by reviewing medical records that were kept at the institution. Demographic data (age and sex) and preoperative and postoperative visual acuity were extracted at different points (Day 1, one week, and one month) where available, and included as well. Also, the intraoperative complications, postoperative complications, and level of patient satisfaction recorded on postoperative follow-up notes or structured questionnaires were recorded to be analyzed.

Outcome Measures: The visual acuity after surgery was the primary outcome measure of the study. Secondary outcome measures were the occurrence of intraoperative and postoperative complications, and the patient satisfaction rates with the outcomes of the surgical procedure.

Statistical Analysis: Statistical programs like SPSS and Microsoft Excel were used to analyse the data. The data were summarized using descriptive statistics such as the mean values and percentages. Paired t-tests were used in the comparison of continuous variables and chi-square tests were used in the comparison of categorical variables where the variables are categorical. Any p-value of below 0.05 was regarded as statistically significant.

Ethical Considerations: This research was carried out with the institutional ethics committee approval. The study ensured that patient confidentiality was observed by anonymizing all identifiable information and all data were only utilized in research.

Results

Demographic Profile: A total of 98 patients who underwent phacoemulsification surgery were included in the study. The patients were aged 40

and up to 80 years, with the majority of the population being older. In this case, the largest percentage of patients (36.7%) was found in the 60-69 years age category, followed by 28.6% in the 50-59 years category. The proportion of patients who were 70 years old and older comprised 22.4% of the study population with only 12.2% being 40-49 years. This suggests that the prevalence of cataracts and surgical treatment was higher among elderly people. When considering gender distribution, the proportion of males in the cases was slightly higher than that of females. The total number of sampled patients was 54 (55.1%) males and 44 (44.9%) females.

Table 1: Demographic Characteristics of Study Population

Variable	Category	Number (n)	Percentage (%)
Age Group	40–49 years	12	12.2
	50–59 years	28	28.6
	60–69 years	36	36.7
	≥70 years	22	22.4
Gender	Male	54	55.1
	Female	44	44.9

Visual Acuity Outcomes: Phacoemulsification surgery led to a studied increase in the level of visual acuity.

Preoperatively, most patients (61.2%) had a visual acuity under 6/60, which is a severe visual impairment. A small percentage of the patients (8.2%) experienced visual acuity of 6/6-12 before surgery. A significant change in favor of positive visual results was observed postoperatively. Most patients (68.4%) had their visual acuity in the range of 6/6-6/12, which indicates excellent surgical results. Also, the percentage of patients with a visual acuity of 6/18 to 6/60 was 24.5 and only 7.1% were in the category of less than 6/60 postoperatively.

Table 2: Preoperative and Postoperative Visual Acuity Distribution

Visual Acuity	Preoperative n (%)	Postoperative n (%)
6/6 – 6/12	8 (8.2%)	67 (68.4%)
6/18 – 6/60	30 (30.6%)	24 (24.5%)
<6/60	60 (61.2%)	7 (7.1%)

Intraoperative Complications: The rate of intraoperative complications was rather low, which means that the level of surgical safety was high. In 4 cases (4.1%), the rupture of the posterior capsule was observed, and in 2 cases (2.0%), the rupture of the zonular dialysis was observed. In 3 cases (3.1%), other minor complications were observed, including difficulty in nucleus emulsification or minor iris trauma. The total number of surgeries was 91.8% with no intraoperative complications.

Table 3: Intraoperative Complications

Complication	Number (n)	Percentage (%)
Posterior capsule rupture	4	4.1
Zonular dialysis	2	2.0
Others	3	3.1
No complications	89	91.8

Postoperative Complications: Postoperative complications were minimal and manageable. The most frequently witnessed complication was corneal edema, which was noted in 8 patients (8.2%), and resolved with proper medical treatment. In the 5 cases (5.1%) followed, posterior capsular opacification was observed. No endophthalmitis cases reported and it shows good practices of aseptic surgery and postoperative care. Overall, 85.7% of patients had an uncomplicated postoperative course.

Table 4: Postoperative Complications

Complication	Number (n)	Percentage (%)
Corneal edema	8	8.2
Posterior capsular opacification	5	5.1
Endophthalmitis	0	0
No complications	85	86.7

Patient Satisfaction: The satisfaction of the patients after phacoemulsification surgery was high. Most patients, 72 (73.5%), were very satisfied with their visual results and overall experience with surgery. The satisfaction was moderate among 20 patients (20.4%), and only 6 (6.1%) patients reported dissatisfaction. Postoperative visual acuity and the few complications were strongly linked to high levels of satisfaction.

Table 5: Patient Satisfaction Levels

Satisfaction Level	Number (n)	Percentage (%)
Highly satisfied	72	73.5
Moderately satisfied	20	20.4
Not satisfied	6	6.1

In general, the findings indicate that phacoemulsification surgery has superior visual results and low complications and patient satisfaction in the study population.

Discussion

The current analysis shows that there is marked enhancement in visual acuity after phacoemulsification surgery and most patients have attained postoperative vision of 6/6 to 6/12. This observation underscores the effectiveness of phacoemulsification in the restoration of functional vision and enhanced quality of life. The same results have been obtained in other national and international studies, with a large percentage of patients showing good visual acuity after surgery. The fact that the number of patients with severe visual impairment (<6/60) has decreased significantly in this study is further indication of the reliability of this surgery.

Complication Rates: The rates of intraoperative and postoperative complications in this study were rather low. Posterior capsule rupture and zonular dialysis were uncommon and post-operative events like corneal edema and posterior capsular opacification were treatable and did not have a significant influence on the outcomes. The absence of serious complications like endophthalmitis signifies that the correct surgical procedures and use of aseptic measures were observed [11]. These complication rates are lower compared to other studies, which indicates that there was high-quality surgical care at the study center. This low rate of complications can be explained by improved surgical procedures, better instrumentation and experience of the surgeons.

The satisfaction of patients was high and most of them stated that they were very satisfied with the results of the surgery. This is highly related to the great enhancement of visual acuity and low rate of complications [12]. The satisfaction of the patient is considered a key outcome measure that has gained a lot of importance in measuring clinical success and the perception of the patient [13]. These study results corroborate other studies that reported that an improved patient satisfaction level is directly related to improved visual outcomes and reduced complications.

Comparison with Literature: This study has found the results to be consistent with the literature (both Indian and global). A series of studies carried out in tertiary care units in India have also found the same visual scores and rates of complication, thereby confirming the effectiveness of phacoemulsification as a technique of choice in carrying out cataract surgery [14,15].

Similar success rates have also been found in international studies, but there might be minor variations because of the differences in the demographics of patients, healthcare infrastructure, and follow-up time. The similarity of the results in varying settings enhances the extrapolation of the results.

Factors Influencing Outcomes: Several reasons could have resulted in positive results in this study. The level of surgical skills is important in reducing complications and achieving optimal results. Modern phacoemulsification machinery and the use of standardized surgical practices also contribute to improved surgical safety and effectiveness. The patient profile, including the timely presentation and the lack of any serious comorbid conditions of the eyes, might also have influenced the positive postoperative recovery and visual outcome.

Strengths and Limitations: The main strength of this study is based on real-world hospital data, which captured the normal clinical practice in a tertiary care environment. This increases the applied usefulness of the results. However, the study has certain limitations. The retrospective design can present the bias of using existing records. The sample size is rather small and it is not possible to generalize the results to a broader population. Moreover, the follow-up period was short, and it might be a limitation in evaluating long-term complications and visual outcomes.

Conclusion

Phacoemulsification surgery has been a safe and highly effective procedure of cataract management with great enhancement of postoperative visual

acuity and overall quality of life. The process has proven to be associated with low levels of intraoperative and postoperative complications, and thus, it can be considered reliable in the normal practice of ophthalmology. High patient satisfaction also contributes to its clinical success and acceptability. These results help justify the further use of phacoemulsification as the standard mode of cataract treatment in tertiary care. However, larger prospective studies that extended follow-up periods are advisable in order to validate long-term outcomes further and support the evidence base.

Recommendations

Patient counseling should be given priority to be able to have realistic expectations of the outcomes of surgery and recovery. Postoperative follow-up systems should be strengthened to facilitate early identification and control of possible complications, which will enhance the overall outcomes. Continuous training and skill acquisition of ophthalmic surgeons should also be a focus as a priority for healthcare institutions so that high levels of surgical accuracy and safety can be maintained. Moreover, the availability of high-level surgical equipment and uniformity in clinical procedures can further improve the results of the treatment. It is desirable that future research projects with region-specific data that can inform policy-making and enhance cataract care services, especially within resource-restrained contexts.

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