Real-World Outcomes of Cataract Surgery at a Tertiary Hospital in Al-Baha, Saudi Arabia: A Retrospective Cohort Study

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ABSTRACT

To evaluate real-world visual outcomes, intraocular pressure (IOP) changes, complication rates, and surgeon-level performance following cataract surgery at a tertiary hospital in Al-Baha, Saudi Arabia. Retrospective cohort study. King Fahad Hospital, Al-Baha, Saudi Arabia. Medical records of all patients who underwent cataract surgery between January and December 2024 were reviewed. Demographic characteristics, systemic and ocular comorbidities, surgical technique, anesthesia type, intraoperative and postoperative complications, and surgeon identifier were recorded. Preoperative and postoperative visual acuity (converted to logMAR) and IOP were analyzed. Statistical comparisons were performed using nonparametric tests and analysis of covariance where appropriate. A total of 230 patients were included (median age 66 years; 54% male). Phacoemulsification with posterior chamber intraocular lens implantation was performed in 98.3% of cases. Median visual acuity improved significantly from 1.00 to 0.17 logMAR ($p < 0.001$), while IOP remained stable ($p = 0.22$). Intraoperative complications occurred in 2.6% of surgeries; no postoperative complications were documented during the available follow-up period. Hypertension was significantly associated with intraoperative complications ($p = 0.004$). Postoperative visual outcomes were comparable across surgeons, although intraoperative complication rates varied significantly at the surgeon level. Cataract surgery at this tertiary center resulted in substantial visual improvement, stable IOP, and a low intraoperative complication rate. Hypertension and surgeon-level factors were associated with intraoperative events, emphasizing the importance of optimized perioperative management and continuous surgical audit.

INTRODUCTION

A cataract is a condition in which the eye's normally transparent crystalline lens becomes cloudy, primarily due to the accumulation of high-molecular-weight proteins or structural changes in lens fibres, resulting in visual impairment[1,2]. It is the leading cause of reversible blindness and visual impairment worldwide[3]. According to the World Health Organization (WHO), more than 2.2 billion people globally have near or distance vision impairment, of which at least 1 billion cases are potentially preventable; cataracts alone account for blindness or significant visual impairment in approximately 94 million people[4]. Despite global initiatives and the WHO's goal to eliminate cataract-related blindness by 2020[5], cataracts remain a major public health concern, particularly in developing countries[6], with substantial impact on quality of life, especially among older adults.

Cataract development is influenced by multiple risk factors, including ageing, ocular trauma, smoking, alcohol consumption and radiation exposure. Systemic conditions such as diabetes, as well as ocular diseases including uveitis, glaucoma and myopia, also contribute to cataract formation, with ageing being the most important associated factor[7].

The standard treatment for cataract is surgical removal of the opacified lens with implantation of an artificial intraocular lens (IOL). This outpatient procedure is generally well tolerated, associated with rapid recovery and substantial visual improvement, and is among the most commonly performed surgeries worldwide, with more than 20 million procedures undertaken annually[8,9]. Phacoemulsification is the preferred surgical technique, as it significantly improves visual function, quality of life and emotional well-being[10]. Although cataract surgery is considered safe and effective[11], it is not without risk. Early postoperative complications may include ocular discomfort, eyelid swelling or bruising, subconjunctival haemorrhage, medication reactions, glaucoma, shallow anterior chamber, corneal clouding, incorrect IOL

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power selection and, rarely, severe infections such as endophthalmitis or toxic anterior segment syndrome[12,13]. Late complications include cystoid macular oedema, retinal detachment and posterior capsular opacification (PCO)[12,14]. Consequently, regular postoperative follow-up is essential to assess visual outcomes and promptly identify and manage complications[15].

To the best of our knowledge, this is the first study to evaluate cataract surgery outcomes and complications in the Al-Baha region of Saudi Arabia. This study aims to address this gap by assessing the success rates and complications of cataract surgery at King Fahad Hospital in Al-Baha, Saudi Arabia. Through this work, we seek to enhance awareness and provide evidence to support improved cataract management and patient care in the region.

METHODS

Study design and setting: This retrospective observational study was conducted in the Ophthalmology Department at King Fahad Hospital (KFH) in the Al-Baha region, Saudi Arabia. KFH is a Ministry of Health–designated tertiary care centre and one of the largest hospitals in the region, with a capacity of over 400 beds. It provides services to patients from all seven governorates of the Al-Baha region.

Sample size determination: All eligible cataract surgery cases that met the inclusion criteria and were performed between January 2024 and December 2024 were reviewed.

Inclusion criteria

Patients were included if they met all of the following criteria:

1. Diagnosed with cataract and underwent cataract surgery at KFH, Al-Baha, between January 2024 and December 2024.
2. Had sufficient medical records available in the hospital's electronic system.
3. Attended scheduled postoperative follow-up appointments.

Exclusion criteria

Patients were excluded if they met any of the following conditions:

1. Did not undergo cataract surgery at KFH, Al-Baha.
2. Had surgery performed outside the study period (before January 2024 or after December 2024).
3. Missed postoperative follow-up visits, resulting in incomplete outcome data.

Data collection and variables: Data were extracted from the hospital's electronic medical records using a structured data collection sheet. The following variables were recorded:

- Demographic data: age, gender and nationality.
- Medical history: systemic comorbidities (including hypertension and diabetes mellitus) and previous ocular history.
- Preoperative assessment: preoperative visual acuity (VA) and preoperative intraocular pressure (IOP).
- Surgical details: type of surgery performed, type of anaesthesia used, intraoperative complications and operating surgeon.
- Postoperative outcomes: VA at last follow-up, postoperative IOP, postoperative complications and postoperative medications prescribed.

Statistical analysis: Data were initially cleaned and organised in Microsoft Excel and subsequently imported into SPSS version 27 (Statistical Product and Service Solutions, SPSS Inc., Chicago, IL, USA) for analysis. The normality of continuous variables was assessed using histograms and the Kolmogorov–Smirnov test. Descriptive statistics were used to summarise the data: medians and interquartile ranges (IQRs) for continuous variables, and frequencies with percentages for categorical variables. Visual acuity values were converted from Snellen fractions to logarithm of the minimum angle of resolution (logMAR) according to Moussa et al.[16]. Missing data for continuous variables were imputed using the median value.

Wilcoxon rank-sum and Fisher's exact tests were used to assess determinants of intraoperative complications. Wilcoxon signed-rank tests were used to compare preoperative and postoperative logMAR VA and preoperative and postoperative IOP. A p-value of < 0.05 was considered statistically significant.

To further examine differences in VA across demographic groups, an analysis of covariance (ANCOVA) was conducted to assess the effects of age group and gender on both preoperative and postoperative logMAR VA. Estimated marginal means were calculated for each factor level, and interaction effects between age group and gender were evaluated. Homogeneity of variances was assessed using Levene's test, and effect sizes were reported using partial eta squared. All ANCOVA analyses were performed using SPSS version 27, with statistical significance set at $p < 0.05$.

Ethical considerations: This retrospective study was approved by the Al-Baha University Research Ethics Committee (REC/SUR/BU-FM/2024/57) and the King Fahad Hospital, Al-Baha Scientific and Research Committee (KFH10032025/4). Data were obtained from existing medical records and analyzed in anonymized form with strict confidentiality. The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

The study included 230 patients undergoing cataract surgery, with a median age of 66 years. More than half were male (54%), and the most common age group was 64–74 years. Over half of the cohort (52%) had

Table 1. Demographic and clinical characteristics of cataract patients

Characteristic	N = 230[1]
Gender	
Female	105 (46%)
Male	125 (54%)
Age	66 (60, 75)
Age groups	
<55 years	24 (10.4%)
55-64 years	65 (28.3%)
64-74 years	74 (32.2%)
74-85 years	57 (24.8%)
>85 years	10 (4.3%)
Nationality	
Saudi	217 (94%)
Non- Saudi	13 (5.7%)
Comorbidities	
Hypertension	94 (41%)
Diabetes mellitus	119 (52%)
Both hypertension and diabetes mellitus	70 (30%)
Past ocular history	
Phacoemulsification + Posterior Chamber Intraocular Lens (PCIOL)	108 (47%)
LASIK Surgery	1 (0.4%)
Scatter laser	1 (0.4%)
Limbal mass removal	1 (0.4%)

[1]n (%); Median (IQR)

Table 2. Ocular and surgical characteristics of the study cohort

Characteristic	**N = 230[1]**
Preoperative IOP	14.00 (12.00, 15.00)
Postoperative IOP	14.0 (13.0, 17.0)
Preoperative logMAR	1.00 (0.60, 1.30)
Postoperative LogMAR	0.17 (0.09, 0.39)
Type of surgery	
Phacoemulsification +posterior chamber intraocular lens (PCIOL) implantation	226 (98.3%)
Extracapsular cataract extraction + posterior chamber intraocular lens (PCIOL) implantation	4 (1.7%)
Anesthesia	
Local	227 (99%)
General	3 (1.3%)
Cases per surgeon	
A	71 (31%)
B	23 (10%)
C	4 (1.7%)
D	5 (2.2%)
E	11 (4.8%)
F	27 (12%)
G	3 (1.3%)
H	19 (8.3%)
I	32 (14%)
J	9 (3.9%)
K	5 (2.2%)
L	3 (1.3%)
M	7 (3.0%)
N	8 (3.5%)
O	2 (0.9%)
P	1 (0.4%)
Intra-operative complications	
posterior capsule tear	1 (0.4%)
Posterior capsule rupture	5 (2.2%)
None	224 (97%)
Post-operative complications	
None	230 (100%)
1Median (IQR); n (%)	

diabetes mellitus, 41% had hypertension and 30% had both conditions (Table 1).

The median preoperative intraocular pressure (IOP) was 14.00 mmHg (interquartile range [IQR]: 12.00–15.00), and the median postoperative IOP was 14.0 mmHg (IQR: 13.0–17.0). The median preoperative logarithm of the minimum angle of resolution (logMAR) visual acuity was 1.00 (IQR: 0.60–1.30), improving to a median postoperative logMAR of 0.17 (IQR: 0.09–0.39).

Phacoemulsification with posterior chamber intraocular lens (PCIOL) implantation was the predominant surgical technique, performed in 98.3% of cases. Local anaesthesia was used in 99% of surgeries, whereas general anaesthesia was used in 1.3%. Intraoperative complications occurred in 2.6% of patients, while 97% experienced no intraoperative complications. No postoperative complications were recorded in any patient within the available follow-up. The most commonly prescribed postoperative medication regimen was moxifloxacin ophthalmic solution and prednisolone acetate ophthalmic suspension every two hours (Q2H) for 14 days, together with paracetamol; this regimen was used in 92% of patients (Table 2).

The median age was higher in the no-complication group than in the complication group ($p = 0.2$). Among patients who underwent phacoemulsification with PCIOL implantation, 2% experienced intraoperative complications, compared with 25% of those who underwent extracapsular cataract extraction with PCIOL implantation; however, the type of surgery was not significantly associated with intraoperative complications ($p = 0.1$). Similarly, postoperative medication regimens were not statistically associated with intraoperative complications ($p > 0.9$). Although patients with intraoperative complications were more frequently prescribed the standard regimen of moxifloxacin and prednisolone acetate with paracetamol, this likely reflects routine postoperative practice rather than a causal effect, as these medications are administered after surgery.

Patients with hypertension had significantly higher rates of intraoperative complications than normotensive patients (6.3% vs 0%, $p = 0.004$). Patients with diabetes mellitus (3.4% vs 1.8%, $p = 0.7$) and those with both hypertension and diabetes (5.7% vs 1.25%, $p = 0.071$) also showed higher rates of intraoperative complications than those without these conditions; however, these differences were not statistically significant (Table 3).

Table 3. Determinants of intraoperative complications

	Intraoperative complications		
Characteristic	**No, N = 224[1]**	**Yes, N = 6[1]**	**p-value[2]**
Age	66 (60, 75)	58 (56, 66)	0.2
Type of surgery			0.1
Phacoemulsification +posterior chamber intraocular lens (PCIOL) implantation	221 (99%)	5 (83%)	
Extracapsular cataract extraction + posterior chamber intraocular lens (PCIOL) implantation	3 (1.3%)	1 (17%)	
Hypertension			0.004
No	136 (61%)	0 (0%)	
Yes	88 (39%)	6 (100%)	
Diabetes mellitus			0.7
No	109 (49%)	2 (33%)	
Yes	115 (51%)	4 (67%)	
Both hypertension and diabetes mellitus			0.071
No	158 (71%)	2 (33%)	
Yes	66 (29%)	4 (67%)	
[1]Median (IQR); n (%)			
[2]Wilcoxon rank sum test; Fisher's exact test			

Intraoperative outcomes varied significantly by surgeon (p = 0.034). Surgeries performed by surgeons A (98.6%), I (96.9%) and F (100%) were almost uniformly free of intraoperative complications, whereas surgeons H (10.5%), L (33.3%) and P (100%) had higher rates of intraoperative complications (Figure 1).

Preoperative visual acuity (logMAR) differed significantly across surgeons (p = 0.010, q = 0.010). Median preoperative logMAR values ranged from 0.60 (IQR: 0.60–1.00) for surgeon F to 2.40 (IQR: 2.40–2.40) for surgeon P (figure 2). In contrast, postoperative visual acuity did not differ significantly among surgeons (p = 0.3, q = 0.3), with most

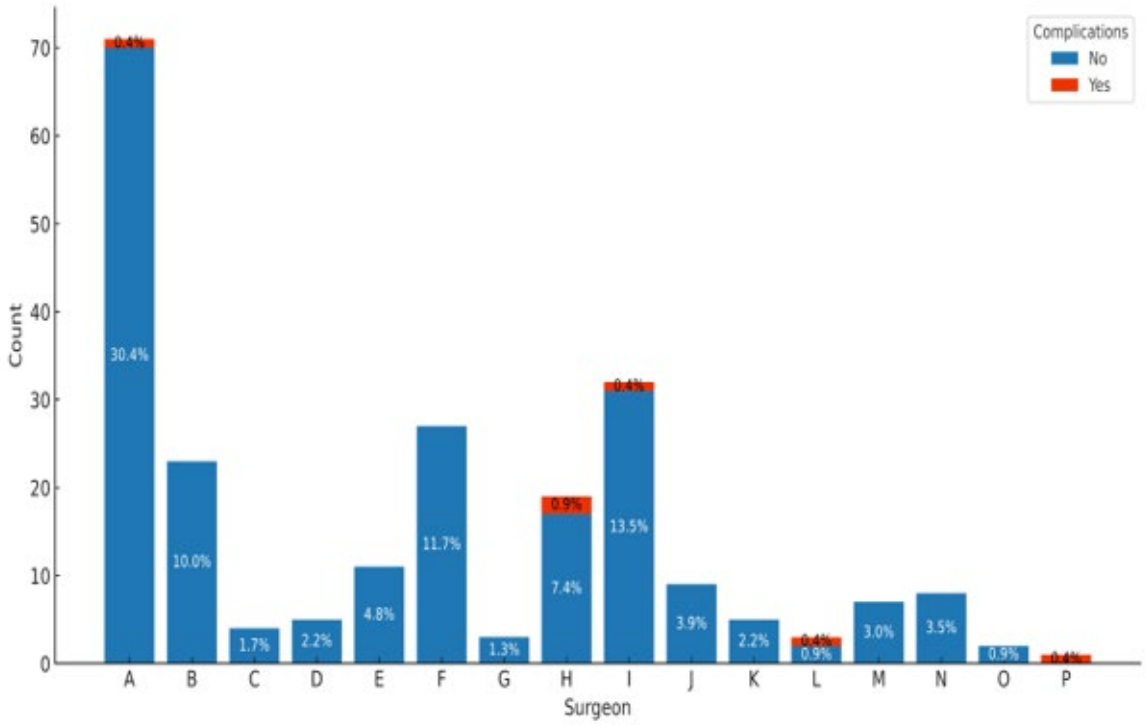

Figure 1. Distribution of intraoperative complications by operating surgeon
Stacked bar chart showing, for each surgeon (A–P), the number and percentage of cataract surgeries with and without intraoperative complications.

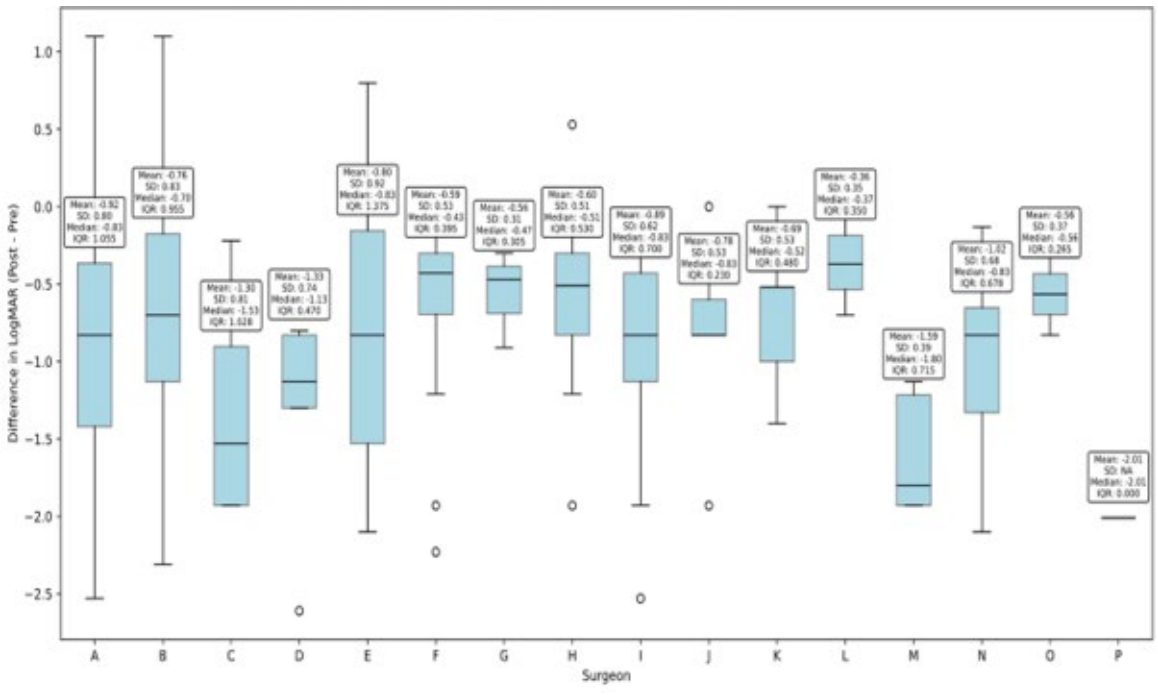

Figure 2. Preoperative visual acuity (logMAR) by operating surgeon
Plot illustrating the distribution of preoperative logMAR visual acuity for eyes operated on by each surgeon (A–P).

achieving a median postoperative VA of 0.17 logMAR. Exceptions included surgeons L [0.60 (0.39–0.80)], G [0.09 (0.05–0.24)] and P [0.39 (0.39–0.39)] (figure 3). The change in logMAR from pre- to postoperative values differed significantly across surgeons ($p = 0.036$, $q = 0.036$). The greatest median improvement was observed in patients operated on by surgeon P (−2.01), followed by surgeons M (−1.80) and C (−1.53), whereas the smallest improvements were seen for surgeons L (−0.37), F (−0.43) and G (−0.47) (Figure 4).

Overall, there was a marked and statistically significant improvement in visual acuity following surgery. Median logMAR decreased from 1.00 preoperatively to 0.17 postoperatively ($p < 0.001$). The rank-biserial correlation ($r = −0.94$, 95% confidence interval [CI]: −0.96 to −0.92) indicated a very strong effect size, reflecting substantial visual gain after cataract surgery (Figure 5).

ANCOVA for preoperative visual acuity (preoperative logMAR) showed no statistically significant differences across age groups ($p = 0.578$) or between genders ($p = 0.243$), and no significant age–gender interaction ($p = 0.237$), indicating comparable levels of preoperative visual impairment across demographic groups. Similarly, postoperative visual acuity (postoperative logMAR) did not differ significantly by age group ($p = 0.346$) or gender ($p = 0.555$), and the interaction between age and gender was not significant ($p = 0.975$). These ANCOVA findings suggest that neither age nor gender influenced pre- or postoperative

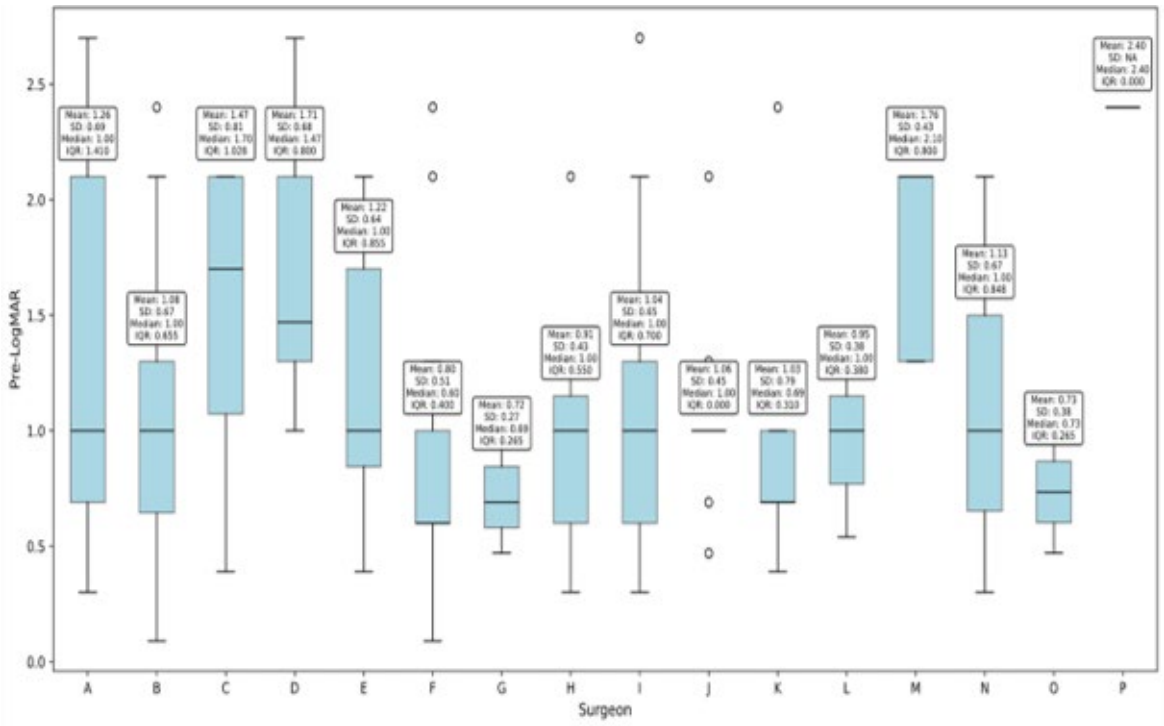

Figure 3. Postoperative visual acuity (logMAR) by operating surgeon
Plot illustrating the distribution of postoperative logMAR visual acuity for eyes operated on by each surgeon (A–P).

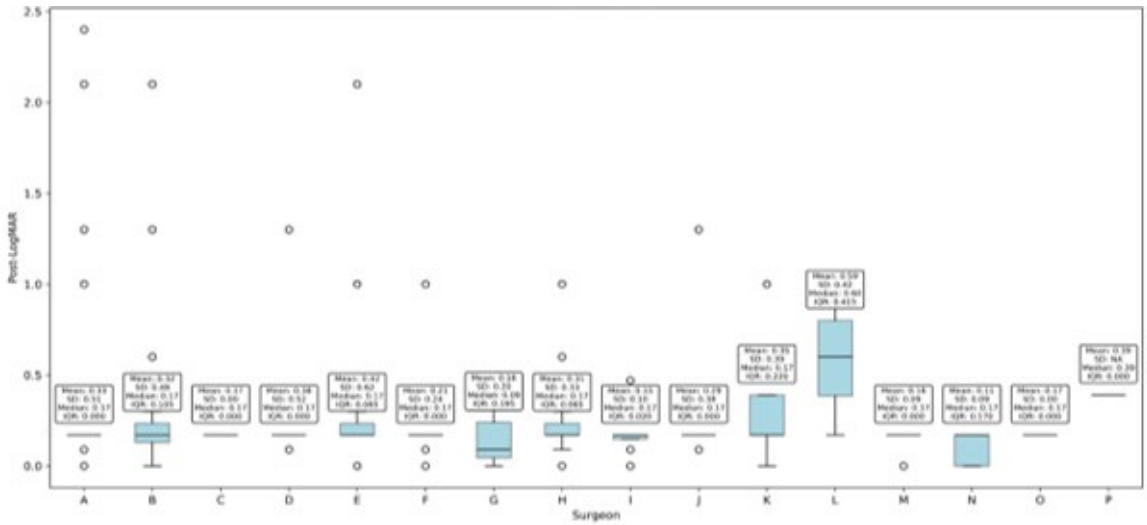

Figure 4. Change in visual acuity (logMAR) by operating surgeon
Plot showing the distribution of the difference between postoperative and preoperative logMAR visual acuity for each surgeon (A–P); negative values indicate improvement in visual acuity after surgery.

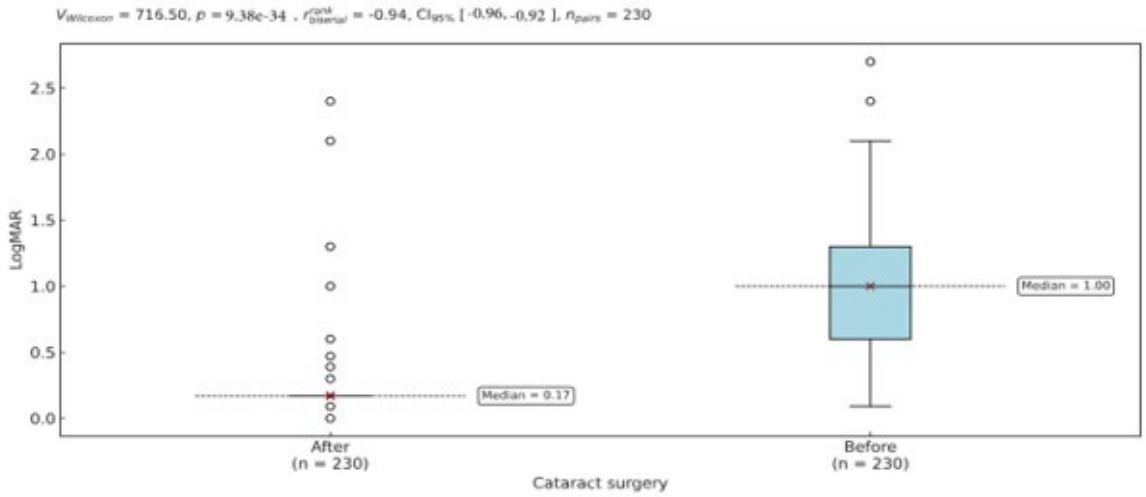

Figure 5. Preoperative versus postoperative logMAR visual acuity
Paired distribution of preoperative and postoperative logMAR visual acuity for all eyes undergoing cataract surgery, demonstrating a significant improvement in visual acuity after surgery (Wilcoxon signed-rank test).

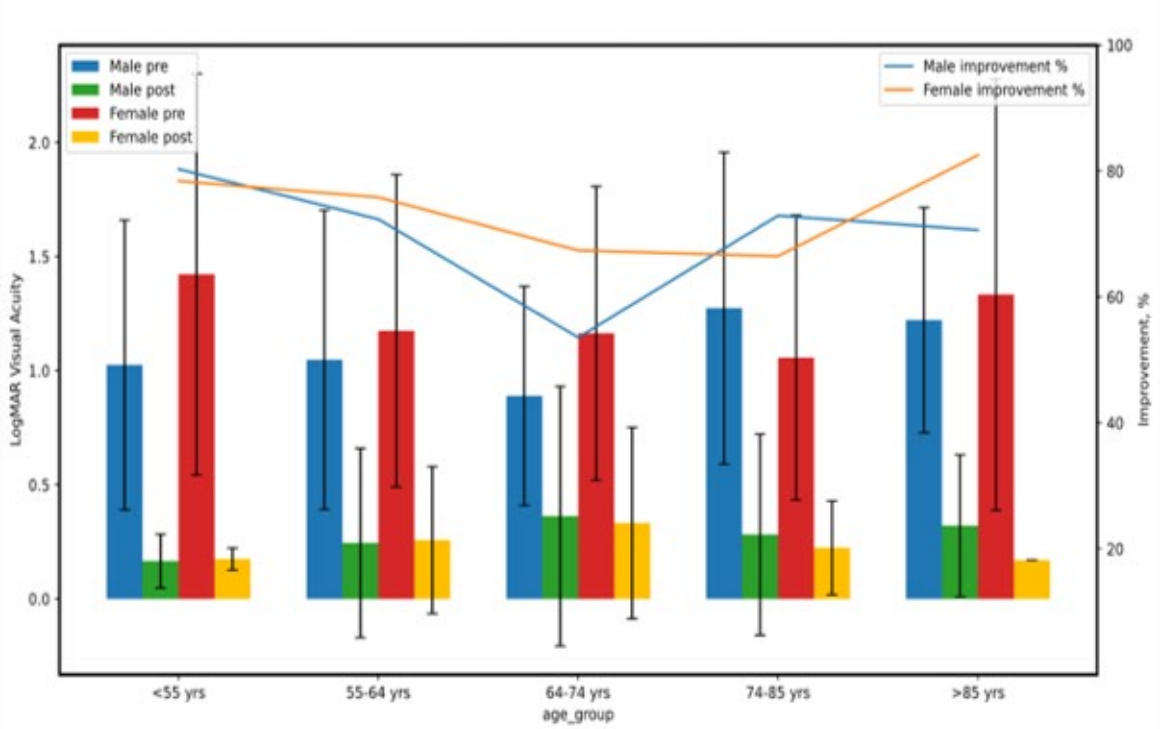

Figure 6. Visual acuity before and after surgery by age group and gender
Plot showing preoperative and postoperative logMAR visual acuity stratified by age group (<55, 55–64, 65–74, 75–85, >85 years) and gender, indicating consistent visual improvement across all demographic categories.

visual acuity, and that the degree of improvement was consistent across demographic categories. This is in keeping with the paired analysis, which demonstrated a significant postoperative gain in visual acuity ($p < 0.001$), supporting the effectiveness and safety of the procedure across diverse patient groups (Figure 6).

Additionally, IOP remained largely unchanged after surgery, with a median of 14.00 mmHg both pre- and postoperatively. This difference was not statistically significant ($p = 0.22$), and the effect size was small ($r = 0.14$, 95% CI: −0.01 to 0.28), indicating that cataract surgery did not meaningfully alter IOP levels (Figure 7).

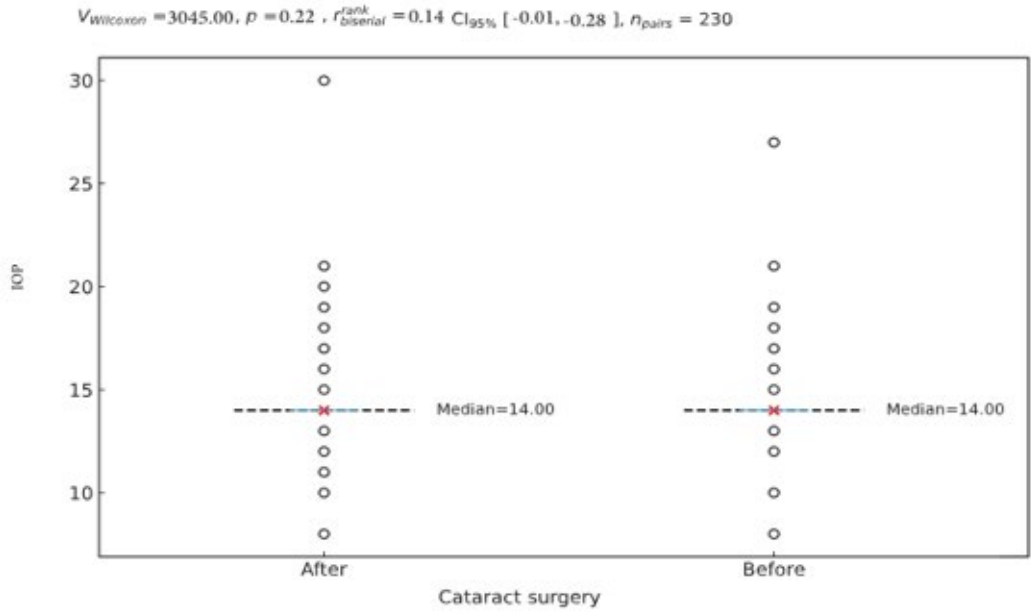

Figure 7. Preoperative versus postoperative intraocular pressure (IOP)
Paired distribution of preoperative and postoperative intraocular pressure (mmHg) for all eyes undergoing cataract surgery, showing no meaningful change in IOP following surgery.

DISCUSSION

This single-centre cohort study of 230 cataract surgeries demonstrated marked visual improvement, stable intraocular pressure and a low rate of intraoperative complications, with no postoperative complications documented. Median visual acuity improved from 1.00 to 0.17 logMAR, with a very large effect size ($r \approx -0.94$), indicating substantial functional gain. Intraocular pressure remained stable pre- and post-operatively (median 14 to 14 mmHg; $p = 0.22$), and intraoperative complications occurred in only 2.6% of cases. The vast majority of procedures were phacoemulsification with posterior chamber IOL implantation (98.3%). Hypertension was the only comorbidity significantly associated with intraoperative events (6.3% vs 0%; $p = 0.004$), whereas diabetes showed no significant association. Across surgeons, preoperative visual acuity differed significantly ($p = 0.010$), postoperative visual acuity was largely comparable ($p = 0.30$) and intraoperative complication rates showed a significant surgeon-level association ($p = 0.034$).

In a systematic review of 31 population-based studies across income settings, Han et al.[17] reported that in high-income countries more than 70% of eyes achieved VA ≥ 20/60 after cataract surgery. By comparison, our cohort's visual acuity improved from 1.00 to 0.17 logMAR with a very large effect size ($r \approx -0.94$), suggesting that most eyes would exceed this threshold. Han et al. also reported refractive error, ocular comorbidities (for example, glaucoma, age-related macular degeneration and diabetic retinopathy), and late surgical sequelae such as posterior capsular opacification (PCO) as leading causes of postoperative visual impairment[17]. In contrast, no postoperative complications were recorded in our cohort during the available follow-up. This discrepancy is likely related to the relatively short follow-up in our dataset, as PCO and other late complications require longer observation to develop and be captured.

Compared with the UK National Ophthalmology Database (NOD) 2023 audit[18], NOD reported 95.8% phacoemulsification with IOL implantation (≈362,000 operations across 159 centres), closely matching our cohort, in which 98.3% of cases were phacoemulsification with posterior chamber IOL. Our crude intraoperative complication rate (2.6%) was higher than that reported by NOD (1.8% for any intraoperative event; 0.9% for posterior capsule rupture [PCR])[18]. However, this comparison is constrained by differences in case mix and surgeon grade mix, and by NOD's risk-adjusted reporting versus our unadjusted results. At the surgeon level, we observed a significant association between individual surgeon and intraoperative events ($p = 0.034$). Unlike NOD, we did not stratify surgeons by training grade or experience, whereas NOD shows higher complication rates in less experienced grades and no risk-adjusted outlier centres or surgeons in 2021[18]. Together, these findings support the view that surgical training and experience are key determinants of safety outcomes and underscore the importance of optimising training for residents and early-career surgeons through increased supervised surgical exposure and structured educational tools such as wet labs and simulation.

Alasbali et al.[19] reported an operative profile comparable to ours, with 99% phacoemulsification with IOL versus 98.3% in our study. Using BCVA ≥ 6/18 (logMAR ≤ 0.48) at 6–8 weeks as their 'good' outcome, 80% of eyes met this threshold[19], while our median postoperative VA was 0.17 logMAR (approximately 6/9). Their intraoperative complication rate was about 1.0% (PCR 2/400; dropped nucleus 2/400) compared with 2.6% in our cohort (PCR 5/230; inferior posterior capsule tear 1/230). Consistent with our findings, diabetes was not a significant predictor of visual outcome in their audit, and we found no significant association between diabetes and intraoperative complications[19]. However, we did not evaluate systemic comorbidities (hypertension, diabetes mellitus) against postoperative VA or IOP. Restricting to the tertiary centre in Subburaman et al.[20], 95.5% of phacoemulsification cases achieved BCVA ≥ 6/12 at 15–49 days; intraoperative complications were 1.4% when counting OCTET grade 2–3 events (for example, PC rent/zonular dialysis), and postoperative complications occurred in 3.7% of eyes, with re-surgery in 0.22%[20]. Surgeon type was not an independent predictor in their study[20]. In our tertiary single-centre cohort, any intraoperative events occurred in 2.6% of eyes and no postoperative complications were recorded within the available follow-up. Differences in classification of complications and

outcome thresholds likely account for some of the apparent variation across studies. For intraocular pressure, Wang et al.[21] observed a decrease from 15.2 mmHg at baseline to approximately 14.2 mmHg at 12 months after cataract surgery, whereas in our cohort the median IOP remained unchanged (14 to 14 mmHg; p = 0.22) at final follow-up.

The surgical pathway at the study centre is broadly aligned with European (ESCRS)[22] and UK (RCOphth)[23] guidance in the routine use of local anaesthesia and small-incision phacoemulsification with in-the-bag monofocal IOL implantation. Differences arise in infection prophylaxis, as ESCRS recommends an intracameral antibiotic at the end of surgery (for example, cefuroxime 1 mg/0.1 mL), whereas our centre relied on postoperative topical moxifloxacin[22]. Regarding postoperative anti-inflammatory therapy, UK and ESCRS guidance support adding a topical NSAID, particularly in higher-risk eyes[22,23], while our centre used a steroid-only regimen.

For refractive optimisation, ESCRS advises considering toric IOLs in patients with corneal astigmatism ≥ 1.0 D, and modern guidelines and expert consensus recommend presbyopia-correcting IOLs (multifocal and EDOF) as effective options for appropriately selected patients, as they are designed to extend the range of focus while limiting photic phenomena[23, 24]. Selection criteria typically include pupil size, corneal quality and the patient's personal and occupational visual demands[23,24]. However, our study centre did not implant toric or other premium IOLs, reflecting current practice in most governmental hospitals nationwide. These guidelines highlight the potential benefit of progressively incorporating premium IOLs into routine practice, including in governmental eye units, by facilitating their availability and supply. This could further optimise the refractive and functional outcomes of cataract surgery at the study centre and in similar regional and national settings.

Hypertension was significantly associated with intraoperative complications in our cohort, which is noteworthy given that hypertension is highly prevalent among cataract patients and is the most common perioperative medical issue in this context. Large studies have shown that hypertensive patients are more likely to experience intraoperative blood pressure spikes than normotensive individuals; however, these episodes do not necessarily translate into surgical or cardiovascular complications[25–28]. Our findings are consistent with known physiological mechanisms, as perioperative increases in blood pressure may elevate choroidal and episcleral venous pressure and raise intraocular pressure, thereby narrowing the safety window for phacoemulsification—particularly during manipulation of the posterior capsule and zonules—and predisposing to events such as zonular dialysis, posterior capsule rupture or, in severe cases, suprachoroidal haemorrhage[29–31].

Nonetheless, the broader literature suggests that elevated preoperative blood pressure alone is not a contraindication to cataract surgery, as studies report very low systemic and ocular complication rates even when preoperative blood pressure is high. For example, a Brazilian cohort with an entry systolic blood pressure (SBP) ≥ 180 mmHg showed no increase in early surgical adverse effects[26]. Moreover, many centres proceed with cataract surgery when SBP < 180 mmHg and diastolic blood pressure (DBP) < 110 mmHg[27]. In practice, our results support careful, continuous perioperative assessment rather than cancellation of surgery. This includes optimisation of blood pressure preoperatively, close intraoperative monitoring and prompt management of hypertensive spikes, and close collaboration with anaesthesia. In addition, attention to the antihypertensive regimen is important, as alpha-1 blockers are strongly associated with intraoperative floppy iris syndrome and more technically demanding surgery, highlighting the need for thorough preoperative medication review, documentation and patient counselling[27,32,33].

Regarding the impact of age on cataract surgery outcomes, most of our patients were in the 64–74-year age group. We observed substantial visual improvement across all age strata (≈70–85%). Improvement was greatest in the youngest group (< 55 years), decreased in the 64–74-year group and then increased again in the 74–85 and > 85-year groups. Nonetheless, age was not a statistically significant predictor of visual acuity improvement across groups.

In contrast, a single-centre retrospective study by Goldstein et al. on 589 patients reported a clear age-related decline in visual improvement, with gains falling from 72% in the 55–65-year group to 61% in the 65–75-year group and 51% in the 75–85-year group (p = 0.002 and p = 0.0004)[34]. Similarly, Jaycock et al., using data from the UK Cataract National Dataset, found a rapid decline in the proportion of eyes achieving 6/6 visual acuity beginning at approximately 65 years of age[35]. The discrepancy between our findings and those of previous studies may partly reflect differences in follow-up duration, as age-related macular and posterior segment pathologies are likely to exert a greater influence on longer-term outcomes than on short-term postoperative logMAR. Nevertheless, the substantial improvement observed across all age groups in our cohort, together with the benefits reported in other studies, underscores the overall effectiveness of cataract surgery in enhancing quality of life at any age and argues against delaying surgery, particularly as younger patients appear to experience the greatest relative visual gain[34,35].

In our cohort, sex did not appear to influence visual outcomes, as we observed comparable improvement in both groups (≈74% in males and 77% in females), despite females presenting with worse preoperative BCVA. Similarly, Geiger et al. reported that although males had slightly worse preoperative BCVA than females, postoperative BCVA was comparable between sexes at approximately 20/25 Snellen, indicating no meaningful sex-related difference in final visual acuity[36]. In contrast, Goldstein et al. found that males generally had greater BCVA improvement and higher odds of achieving functional vision (< 0.3 logMAR)[34], and another multicentre study reported that men were slightly more likely than women to achieve a minimal clinically important improvement in visual acuity postoperatively[37].

This discrepancy may be partly explained by the fact that prior studies demonstrating a male advantage often used more stringent categorical thresholds (for example, functional BCVA or MCID) and larger, multicentre samples, making them more sensitive to modest sex-related differences than our analysis based on continuous logMAR change. Further investigation into the sources of these differences is warranted. Nonetheless, taken together with the findings of Geiger et al.[36], our results suggest that when cataract surgery is standardised and consistently delivered, sex differences in visual acuity outcomes can be minimal.

Limitations

This retrospective, single-centre study is vulnerable to selection and information bias, which may limit generalisability. Missing data, particularly for postoperative VA and IOP, could bias estimates and reduce precision. Limited follow-up may underestimate late events such as PCO and other delayed complications. Finally, our findings highlight the need for rigorous, standardised documentation to strengthen the validity of future record-based analyses.

CONCLUSION

This single-center cohort of 230 cataract surgeries showed that small-incision phacoemulsification with posterior chamber IOL implantation achieved large improvements in visual acuity, stable intraocular pressure and a low rate of intraoperative complications, with no postoperative complications recorded. Visual gains were consistent across age groups and between sexes.

Hypertension was the only systemic comorbidity significantly associated with intraoperative complications, underscoring the need for structured perioperative blood pressure optimisation and careful review of antihypertensive therapy. Surgeon-level analysis showed that postoperative outcomes were broadly similar across surgeons, whereas intraoperative complications were concentrated in a limited number of surgeons, supporting ongoing audit and targeted training for less-experienced surgeons.

Finally, while the surgical pathway at the study center is broadly aligned with international guidelines, the absence of premium IOL implantation highlights opportunities to further modernize practice. Facilitating access to toric and presbyopia-correcting IOLs within the governmental sector may help to optimize the refractive and functional outcomes of cataract surgery in similar settings.

Authorship Contribution: RMA conceived and designed the study, coordinated data collection, performed the statistical analysis, interpreted the results, and drafted and revised the manuscript.

AMA and SAA contributed to data collection, assisted with data cleaning and preliminary analysis, and contributed to drafting and revising the manuscript.

AEA, SIA, NJA, RAA, MAA, and AAEA contributed to patient identification, chart review, data collection, verification of the study database, and manuscript review.

AHA and MAB supervised the study, contributed to study conception and design, guided data analysis and interpretation, and critically revised the manuscript for important intellectual content.

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