

## Visual Outcomes of Cataract Surgery with Foldable Lens

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### ABSTRACT:

**Objective:** To determine the visual outcomes of cataract surgery with foldable lens at tertiary care eye hospital Sindh-Pakistan.

**Study design and setting:** An observational cross-sectional study carried out at Ghulam Muhammad Maher Medical College (GMMMC) Sukkur from February 2020 to January 2022.

**Methodology:** A Non-probability purposive sampling was used. Inclusion were all individuals attending eye OPD with complaint of cloudy vision and diagnosed with cataract. Patients suffering from corneal diseases, chronic anterior uveitis intraocular pressure >22 mmHg, high ametropia and Diabetes Mellitus were excluded from the study. SPSS was used to analyze data.

**Results:** Total of 153 patients were selected for this study. Age of the patients was from 40 to 72 years. 60% of patients were between 40-60 years age whereas 40% were above 60 years. Gender differences observed 73 (48%) female and 80(52%) male. On 1<sup>st</sup> postoperative day Best Corrected Visual acuity (BCVA) was 6/9 in 90 patients, 6/12 in 40 patients and 6/6 in 23 patients. After 1 week follow-up, BCVA was 6/6 in 100 patients, 6/9 in 33 patients and 6/12 in 20 patients. After 1 month, BCVA was recorded as 6/6 in 130 patients, 6/9 in 20 and 6/12 in 3 patients.

**Conclusion:** Visual acuity outcome with foldable lens after Phacoemulsification was found excellent within one month. Implantation of foldable lens with phacoemulsification gives better results in terms of visual acuity.

**Keywords:** Cataract, Foldable lens, Phacoemulsification, Visual Acuity

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### INTRODUCTION:

Cataract is cloudiness of lens in the eye. It is the most common cause of blindness that is reversible globally. Epidemiology showed that nearly 50% of blindness is due to cataract. In South Asia, Pakistan is the third most top country in context of vision impairment and blindness. This burden has been increasing since last decade of 20<sup>th</sup> century.<sup>1</sup>

Non Foldable Intra Ocular Lens (IOL) was initially inserted through 5 mm to 7 mm incisions after extra capsular surgery. Large fraction of the population in from 4<sup>th</sup> decade of life develops a loss of vision due to cataract.<sup>2</sup> It is a condition in which natural lens of eye becomes cloudy affecting the vision of the patient. The surgery involves making incision in eye to remove opaque fibers which are developed in the natural lens. Natural lens is removed while the lens membrane (capsule) is kept intact and IOL implanted at the site of natural lens for restoration of vision.<sup>3</sup>

Though it is a common procedure but it involves the meticulous handling. Foldable IOL is the latest development for the cataract surgery that is made up of silicone or acrylic.<sup>4</sup> Foldable IOL have proved to be effective and having good results as compared to rigid lens. Healing has improved dramatically and complications have reduced drastically. It

made phacoemulsification as a standard tool in cataract surgery. According to an estimate by Richard L, 90% of lenses implanted in United States are foldable acrylic/silicone and Phacoemulsification is performed in 95% of patients of Cataract.<sup>5,6</sup>

Small size of incision is advantage of phaco surgery and not IOL implant surgery. The incision is only eighth of an inch (3mm or smaller) and there is no need of sutures and it heals by itself.<sup>7</sup> Foldable implants inserted are flexible and can be maneuvered. This lens can also be used to correct astigmatism and short sight undergone for cataract surgery.<sup>8,9</sup>

The rationale was to check visual outcomes of foldable lens in cataract surgery with least complication, rapid healing and better visual outcomes.

#### METHODOLOGY:

This was a cross-sectional study with non-probability convenience sampling done at Ghulam Muhammad Maher Medical College (GMMMC) Sukkur from February 2020 to January 2022. Ethical approval was taken from the institutional review board of the institute prior to the study with protocol # RP/04-2020. Sample size was calculated from World Health Organization (WHO) online calculator by taking 95% confidence interval and 5% error margin. Prevalence of cataract in a hospital study done in Karachi was considered as 15.7%. Memon AF, Mahar PS, Memon MS, Mumtaz SN, Shaikh SA, Fahim MF. Age-related cataract and its types in patients with and without type 2 diabetes mellitus: A Hospital-based comparative study. J Pak Med Assoc. 2016; 66(10): 1272-1276. PMID: 27686302. It was derived to be 153.

History was taken from all the patient and was followed by slit lamp examination with cloudy vision and diagnosed as Cataract were included in study. Patients suffering from corneal disease, chronic anterior uveitis intraocular pressure >22 mmHg, high ametropia and Diabetes Mellitus, any other ocular pathology, complicated cases and non-consenting patients were excluded from the study. A written informed consent was taken from all patients. Preoperatively, blood sugar apart from other routine investigations and visual profile were done of all patients. Blood pressure was also checked of each patient. Examination of eye was done with slit lamp and patients were categorized into three categories 6/18 vision of cataract patients were labeled as immature, 6/>18 were diagnosed as mature and 4/60 were labeled as hyper mature.

**Surgical Procedure:** A single Surgeon performed all surgeries. After aseptic measures, topical anesthesia was given to all patients. Two ports were made main port was made 11 O Clock and side port was made at 3 O clock then visco elastic was applied. Capsulorhexis was done along with hydro dissection. Nucleus was separated from posterior capsule then rotation of nucleus was done. Phacoemulsification was done. Irrigation/aspiration of remaining cortical material

was done. Foldable lens was injected and viscoelastic was removed by irrigation.

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 23.0. Continuous variables like age was presented as Mean± SD. Categorical variables were shown as frequency and percentages. Significance level was checked through Chi-square test. P-value = 0.05 was considered as statistically significant.

#### RESULTS:

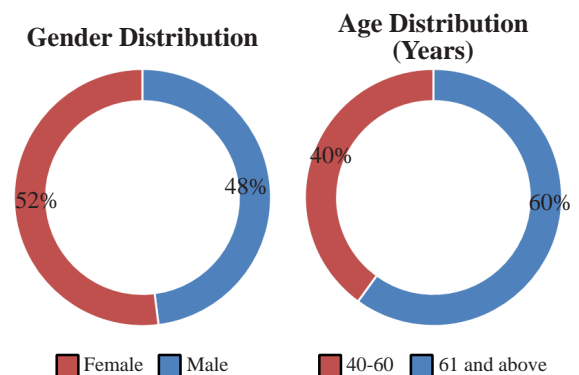
A total of 153 patients were enrolled in this study. Mean age of participants was 50.23±5.5 with a range of 40 to 72 years. There were 40% of participants in 40-60 years of age group and 60% were in 61 and above age group. Gender distribution was 73 (48%) females and 80 (52%) males. (Figure 1)

Unilateral cataract was seen in 141 (92%) patients and bilateral was seen in 12 (8%) patients. Post-operatively visual acuity was assessed at different follow-ups with respect to age groups. On first post-operative day, there were 12 (13.0%) respondents with 6/6 best corrected visual acuity, at first week 49 (53.3%) respondents and at first-month follow-up 69 (75.0%) respondents presented with age group 40-60 years. However, 61 and above year age group also increased number of respondents at different follow-ups as 11 (18.0%) at first post-operative day, 51 (83.6%) at first week and 61 (100%) achieved 6/6 vision. Statistically significant P-value <0.0001 was seen at first week and first month post-operative day (Table 1). Females achieved 6/6 visual acuity more rapidly at different follow-ups. There were 23 (31.5%) at first post-operative day, 73 (100%) at first week, 73 (100%) at first-month follow-up. However, males achieved 6/6 visual acuity at first week 27 (33.8%) and 57 (71.3%) at first month follow-up with a statistically significant P-value <0.0001. (Table 2)

#### DISCUSSION:

Cataract is a disease in which a natural lens is replaced by an artificial one aimed at restoring the loss of vision.<sup>11</sup> Phacoemulsification with Foldable IOL is the latest development in surgical techniques of cataract. Incision is smaller and a foldable lens can be implanted through it. It

Figure 1: Age and Gender Distribution



is the procedure of choice in developed countries but nowadays it has been becoming the gold standard<sup>12</sup> method for cataract surgery throughout the world. Its smaller incision produces less astigmatism and better visual results after surgery. In multiple trials, phacoemulsification has superseded in results as compared to extracapsular cataract surgery.<sup>13</sup>

In present study visual outcomes were improved after foldable lens implant with respect to age and gender with significant P-value of <0.001. In comparison, Thevi T et al<sup>14</sup> reported that use of different type of IOL found significant results on the basis of visual acuity. Foldable lenses had good visual outcomes as compared to non-foldable lenses. However, a study<sup>15</sup> had contradictory results. Similarly, the American Academy of Ophthalmology showed no difference in outcomes related to visual acuity after applying foldable or non-foldable lenses in patients with cataract surgery.<sup>16</sup>

Narian Das et al<sup>17</sup> reported age of the patients operated for phacoemulsification with foldable lens was from 35 to 70 years

Mahesar ML et al<sup>18</sup> reported gender distribution in cataract surgery patients was 48% of males and 39% of females. A study reported<sup>19</sup> prevalence of cataract surgery was higher in women than men with ratio of 1.8% and 1.67% respectively. In the present study, 60% patients were of age between 40-60 years where as 40% were above 60 years and the prevalence was reverse 48% women presented with

cataract and 52% male patients had complained of cataract.

According to vision loss burden in Pakistan (1990-2025)<sup>20</sup> 61.9% had bilateral and 38.1% had unilateral cataract. They also reported crude prevalence of bilateral cataract as 1.75%. Another study done by Khoramnia R et al<sup>21</sup> reported crude prevalence of 8.0% (95% CI 7.6%, 8.4%). However, present study showed 80% had unilateral cataract and 20% had bilateral cataract.

Ahsan S et al<sup>22</sup> stated in their article that post-operative visual acuity was 6/6 in 90.4% patients who were operated for Phacoemulsification with Foldable lens and poor outcome was reported in 1.0%. However in present study, visual acuity on 1<sup>st</sup> postoperative day was 6/6 in 15%, 6/9 in 59% and 6/12 in 23% of patients. After one week, visual acuity of 6/6 was in 65%, 6/9 in 22% and 6/12 in 13% of patients. After one month, visual acuity was reported 6/6 in 85%, 6/9 in 13% and 6/12 in 2% patients only. Present study had more visibility and improvement in Post-operative visual acuity at each follow-up.

**CONCLUSION:**

Visual acuity outcome with foldable lens after phacoemulsification was found excellent within one month. Implantation of foldable lens with phacoemulsification gives better results in terms of visual acuity. This procedure is safe and affordable to all patients undergoing phacoemulsification.

Table 1: Comparative analysis of Age and Post-operative Visual Acuity

	1st Post Operative day		P-value	1st Week Post Operative		P-value	1st Month Post Operative		P-value
	age			day age			day age		
Visual Acuity	40-60 (n=92)	61 and above (n=61)		40-60 (n=92)	61 and above (n=61)		40-60 (n=92)	61 and above (n=61)	
6/6	12	11	0.079	49	51	0.000	69	61	0.000
	13.0%	18.0%		53.3%	83.6%		75.0%	100.0%	
6/9	50	40		23	10		20	0	
	54.3%	65.6%		25.0%	16.4%		21.7%	0.0%	
6/12	30	10		20	0		3	0	
	32.6%	16.4%		21.7%	0.0%		3.3%	0.0%	

Table 2: Comparative analysis of Gender and Post-operative Visual Acuity

	1st Post Operative day		P-value	1st Week Post Operative		P-value	1st Month Post Operative		P-value
	gender			day gender			day gender		
Visual Acuity	Female (n=73)	Male (n=80)		Female (n=73)	Male (n=80)		Female (n=73)	Male (n=80)	
6/6	23	0	0.000	73	27	0.000	73	57	0.000
	31.5%	0.0%		100.0%	33.8%		100.0%	71.3%	
6/9	50	40		0	33		0	20	
	68.5%	50.0%		0.0%	41.3%		0.0%	25.0%	
6/12	0	40		0	20		0	3	
	0.0%	50.0%		0.0%	25.0%		0.0%	3.8%	

**Authors Contribution:**

**Ateeq Ur Rehman Channa:** Conceived the study, Manuscript writing, Design of study, Literature review

**Ataullah Bukhari:** Study design & Methodology writing

**Abdul Haleem Mirani:** Manuscript writing, Clinical work and data collection

**Tehmina Imdad:** Statistical Analysis and Results

**Maqbool Ahmed Jamali:** Supervised the work and final review

**Sikandar Azeem Mirza:** Discussion writing and Final Review

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