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DESCRIPTIVE RESEARCH

Visual Outcome of Phacoemulsification at Griya Husada Eye Center, Madiun, Indonesia

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Abstract

Introduction: Sight is one of the most important senses that absorbs more than 80% of visual information. However, visual disturbances are common, ranging from mild to severe disturbances that can lead to blindness. A cataract is the leading cause of blindness in Indonesia; it is accountable for 77.7% of all blindness. Phacoemulsification is a new ECCE technique in which cloudy or cataractous lenses are removed through a 2-3 mm incision with no sutures. The advantages of this small incision are faster visual recovery, minimal astigmatic induction due to surgery, and minimal postoperative complications and inflammation. **Purpose:** This study aimed to measure visual outcomes in senile cataract patients after phacoemulsification surgery at Griya Husada Eye Center, Madiun, Indonesia. **Methods:** A Retrospective study was carried out among senile cataract patients who had phacoemulsification surgery at Griya Husada Eye Center, Madiun, Indonesia between January and May 2021. The best corrected visual acuity (BCVA) was recorded on the fourteenth day. **Results:** From 292 patients, postoperative visual acuity in the good category (6/6 - 6/18) was 94.9%, in the moderate category (<6/18 - 6/60) was 1.7%, and in the poor category (<6/60) was 3.4%. **Conclusions:** Postoperative visual acuity with phacoemulsification at Griya Husada Eye Center, Madiun, Indonesia showed satisfactory results and met World Health Organization's (WHO) standards.

Keywords: visual acuity; senile cataract; phacoemulsification

Introduction

Sight is one of the most important senses that absorbs more than 80% of visual information. In addition, it helps humans visualize objects, light, color, and depth perception. However, visual disturbances are common, ranging from mild to severe disturbances that can lead to blindness.[1]

A cataract is the leading cause of blindness in Indonesia, it is accountable for 77.7% of all blindness.[1] The prevalence of cataract-related blindness in Indonesia and East Java is approximately 3% and 4.4%, respectively.[1] Cataract is a clouding of the lens-induced by several conditions such as hydration or the addition of lens fluid, denaturation of lens proteins, or a combination of the two.[2]

Cataract surgery in both eyes remains the appropriate treatment for patients with bilateral, cataract-induced visual impairment. The most common reason for cataract surgery is a disturbance of functional visual acuity, which impair the patient's activities.[3]

Intra capsular cataract extraction (ICCE), extra capsular cataract extraction (ECCE), small incision cataract surgery (SICS), and phacoemulsification are examples of cataract extraction surgery techniques. Phacoemulsification is a new ECCE technique in which cloudy or cataractous lenses are removed through a 2-3 mm incision with no sutures.[4] The advantages of this small incision are faster visual recovery, minimal astigmatic induction due to surgery, and minimal postoperative complications and inflammation.[4] This study aims to reveal the visual outcome of phacoemulsification performed at Griya Husada Eye Center, Madiun, Indonesia.

Table 1. Patients characteristics.

Characteristics	Frequency	Percentage (%)
Age		
50-60	57	19.5
61-70	156	53.4
71-80	70	24.0
81-90	9	3.1
Total	**292**	**100**
Sex		
Male	147	50.4
Female	145	49.6
Total	**292**	**100**
Operated eye		
Right	149	51%
Left	143	49%
Total	**292**	**100**
Stage of cataract		
Immature	284	97.2
Mature	8	2.8
Total	**292**	**100**

Methods

A retrospective study of cataract patients at Griya Husada Eye Center, Madiun, Indonesia that underwent phacoemulsification surgery from January to May 2021 was included. This study was approved by the Health Research Ethics Committee at Universitas Airlangga, Faculty of Medicine, Surabaya, Indonesia (Permit Number: 24/EC/KEPK/FKUA/2022). The medical records were used, and all efforts were made to maintain confidentiality.

Participants included in this study were patients with senile cataract, aged 50 years or older, male or female, who underwent phacoemulsification surgery, and had complete medical records. Participants were excluded from this study if they met one of these criteria: the patient was referred to another hospital, the patient did not come again during the visual evaluation, the patient had a history of eye diseases other than cataract (which referred to as glaucoma, retinal detachment, diabetic retinopathy, macular degeneration), the patient had a history of uncontrolled systemic disease (hypertension, diabetes mellitus), and the patient had a history of previous eye trauma.

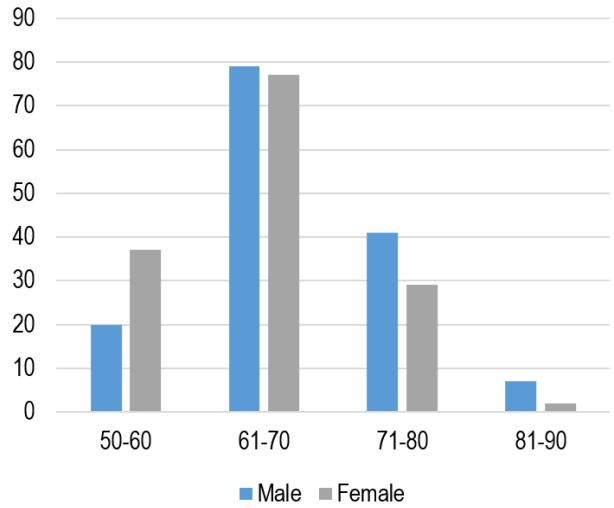

Chart 1. Comparison of sex by age group.

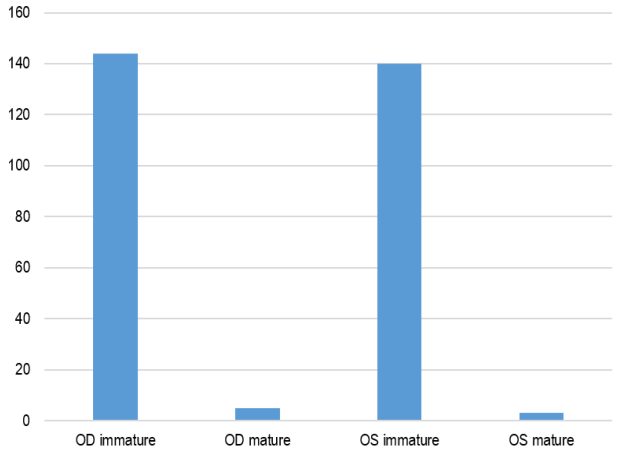

Chart 2. Comparison between grading of cataracts with the operated eyes.

The best corrected visual acuity (BCVA) from medical records was recorded preoperatively on day one, day seven, and day fourteen. Postoperative visual acuity will be grouped based on WHO[5] criteria: as good (visual acuity worse than 6/6 to 6/18), moderate (visual acuity worse than 6/18 to 6/60), poor (visual acuity worse than 6/60 to 3/60), and blindness (visual acuity worse than 3/60).

Results

During the study period, 292 patients were eligible for this study. The youngest age was 52 years and the oldest was 87 years. As shown in Table 1, the most significant proportion was found in the 61-70 years age group (53.4%), followed by the age group of 71-80 years (24%), and the age group of 50-60 years (19.5%). A minor proportion was noted in the 81-90 age group (3.1%). Most participants were male, with as many as 147 patients (50.4%). As for the cataract grading, 284 (97.2%) patients had immature cataract, and only 8 (2.8%) patients had mature cataracts.

Chart 1 illustrates the comparison of sex by age group. There were 20 males and 37 women in the 51-60 age group. Seventy-nine males and 77 women were in the second age group, 61-70 years old. Furthermore, the third age group, 71-80 years, obtained 41 men and 29 women. Meanwhile, seven were obtained in the age group of 81-90. In this study, the most cataract patients were found in men and women between the ages of 61 and 70.

One hundred and forty-four (49.3%) patients had an immature cataract in the right eye and five (1.7%) patients had a mature cataract in the right eye. One hundred and thirty-eight (47.9%) patients had an immature cataract

Table 2. Characteristics of preoperative and postoperative visual acuity.

Characteristics	Frequency	Percentage (%)
Preoperative visual acuity		
Good (6/6-6/18)	28	9.6
Moderate (<6/18-6/60)	31	10.6
Poor (<6/60-3/60)	233	79.8
Total	**292**	**100**
1st-day postoperative visual acuity		
Good (6/6-6/18)	225	77
Moderate (<6/18-6/60)	12	4.1
Poor (<6/60-3/60)	55	18.9
Total	**292**	**100**
7th-day postoperative visual acuity		
Good (6/6-6/18)	267	91.4
Moderate (<6/18-6/60)	4	1.4
Poor (<6/60-3/60)	21	7.2%
Total	**292**	**100**
14th-day postoperative visual acuity		
Good (6/6-6/18)	277	94.9%
Moderate (<6/18-6/60)	5	1.7%
Poor (<6/60-3/60)	10	3.4%
Total	**292**	**100**

in the left eye, and three (1.0%) patients had a mature cataract in the left eye.

Based on the Table 2, the majority (79.8%) of the preoperative visual acuity among participants had poor visual acuity, followed by the moderate vision category (10.6%) and the good vision category (9.6%).

On the first day of postoperative follow-up, the visual acuity was improved to the good vision category in 225 (77%) patients, 12 (4.1%) patients were in the moderate vision category, and 55 (18.9%) patients were in the poor vision category.

On the seventh day post-cataract surgery, the majority of patients had good vision, with 267 (91.4%) patients in the good vision category, 21 (7.2%) patients in the poor vision category, and four (1.2%) patients in the moderate vision category.

On the on the fourteenth day, the visual evaluation revealed that 277 (94.9%) patients had good vision, five (1.7%) patients had the moderate vision, and ten (3.4%) patients had poor vision.

Based on the Table 3, the 61-70 years age group has the best vision category, followed by the 71-80 years age group and the 61-70 years age group on the fourteenth day of postoperative follow-up. The number of eyes with poor visual outcomes was evenly distributed in three age groups (61-70, 71-80, and 81-90 eye groups).

Table 3. Comparison of age characteristics with 14th-day postoperative visual acuity.

Age Characteristic	14th-day postoperative visual acuity			Total
	Good n (%)	Moderate n (%)	Poor n (%)	
50-60	56 (19.2)	0 (0)	1 (0.3)	**57**
61-70	150 (51.4)	3 (1)	3 (1)	**156**
71-80	65 (22.3)	2 (0.8)	3 (1)	**70**
81-90	6 (2)	0 (0)	3 (1)	**9**
Total	**277 (94.9)**	**5 (1.7)**	**10 (3.4)**	**292**

From Chart 3, only 31 of 292 eyes experienced complications of Descemet's membrane fold post-cataract surgery using the phacoemulsification technique.

Based on Table 4, 254 patients had improved visual acuity (87%) on the fourteenth day after surgery. Thirty-eight (13%) patients remained in the same vision category group, 28 patients stayed in the good vision category, and ten patients were in the poor.

Discussion

The subjects in this study were elderly individuals aged 50 years and older, and the most senile cataract patients were at the age of 61-70 years, as many as 156 people or 53.4%. Similar to previous research[6], cataract patients are mainly in the same age group (74.2%). The ageing process can cause the lens to harden and lose clarity. With age, the subepithelial lamellar fibers continue to be produced, so the lens becomes more extensive and less elastic over time.[7]

The majority of subjects in this study were men 147 patients (50.4%). This might be due to the more prolonged exposure to ultraviolet lights in men than women. Risk factors for cataracts include old age, trauma, toxins, systemic diseases (such as diabetes), exposure

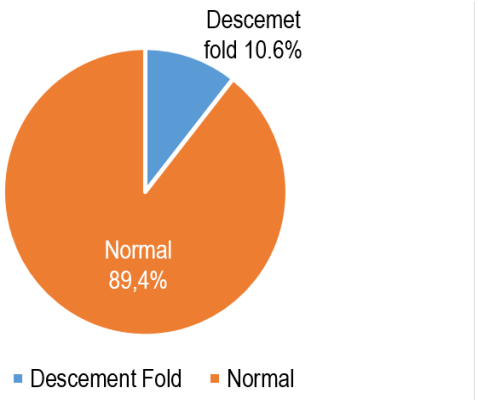

Chart 3. Descemet fold percentage.

Table 4. The shifting of preoperative and 14th postoperative visual acuity.

Characteristic	Visual acuity category	Frequency (%)
The shifting of preoperative and 14th-day postoperative visual acuity	Improve	254 (87)
	Worsen	-
	Stabilize	38 (13)

to ultraviolet and infrared rays, smoking, and alcohol consumption.[8] Moreover, the higher prevalence of cataracts in men may be related to some of the above risk factors, such as smoking and systemic diseases. However, it is different from other studies that stated the prevalence of cataracts is higher in women (54.3%).[9] Significant decreases in the amount of estrogen production in menopause could lead to the development of cataracts.

In this study, the right eye was operated on more than the left eye, with 149 eyes (51%). This is consistent with the result of the previous study.[10] From the perspective of the cataract grading, most patients had immature cataracts (97.2%), followed by mature cataracts (2.8%). This result could be due to society's increased awareness of visual impairment related to cataracts.

The distribution of good visual acuity on the fourteenth day of postoperative follow-up was primarily found in the 61-70 age group; other research stated that the highest proportion of good postoperative visual acuity was found in the younger age group.[11]

The expectation of visual outcome according to World Health Organization (WHO) standards are as follows; good visual acuity (6/6-6/18) by 85%, moderate visual acuity (<6/18-6/60) ranged from 15% to 5%, and poor visual acuity (<6/60) is less than 5%.[12]

The postoperative good visual outcome on the first day was 77%, indicating that the result meets WHO criteria. There was a poor visual outcome in 18.9%, which was higher than the WHO expectation criteria. This condition could be due to the presence of Descemet's membrane fold during the early postoperative days.

On the fourteenth day of postoperative follow-up, the good visual outcome group improved to 94.9%, and the poor vision became 3.4%. The categories of good and poor vision have met WHO's standards. The results of this study are better than a study from Rizki[11] which the postoperative visual outcome of phacoemulsification with good standards is 69%. This study's result was similar to Odang's research[13] in that the good visual outcome reached the WHO expectation (96.6%). The difference in the results of these studies might be due to preoperative factors (history of other eye diseases and history of systemic disease), intraoperative factors (surgeon, duration of operation, intraocular lens (IOL) power measurement), and postoperative factors (treatment and complications). In phacoemulsification surgery, longer phaco time will affect the healing process of the surgical wound. In addition, endothelium cell damage during surgery could also affect the visual outcome.[14],[15]

Conclusions

Postoperative visual outcome of phacoemulsification at Griya Husada Eye Center, Madiun, Indonesia shows satisfactory results and met WHO good standards.

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