



Visual Outcomes of Senile Cataract Patients Post-Cataract Surgery at JEC-Orbita Eye Clinic Makassar

Hadijah Basalamah¹, Sri Irmandha Kusumawardhani², Muh. Fadly Hidayat³, Azizah Anoez¹, Hannah Aulia Namirah⁵

¹Faculty of Medicine, Universitas Muslim Indonesia, Indonesia

²Clinical Lecturer, Department of Ophthalmology, Ibnu Sina Hospital Makassar, Indonesia

³Clinical Lecturer, Department of Ophthalmology, Makassar Eye Hospital, Indonesia

⁵Clinical Lecturer, Department of Ophthalmology, JEC-Orbita Eye Clinic Makassar, Indonesia



*Corresponding Author: Hadijah Basalamah

Article Info

Article history:

Received 12 November 2024

Received in revised form 7

December 2024

Accepted 29 December 2024

Keywords:

Senile cataract

Visual outcome

Cataract surgery

Abstract

Cataracts are a major cause of blindness worldwide. World Health Organization (WHO) data in 2020, cataract is the most common eye disorder that causes blindness and visual impairment. Postoperative visual acuity is a simple direct parameter that can reflect the quality of cataract surgery and postoperative care. Descriptive in nature with a cross-sectional approach (cross-sectional) using secondary data obtained from medical records. The sampling technique used random sampling with a total of 97 samples. A study conducted at the JEC-ORBITA Main Eye Clinic in Makassar City from January 2024 to June 2024 on patients diagnosed with senile cataracts found 3466 patients. This study showed that the highest proportion occurred in female gender 54 (55.7%), elderly age category (60-74 years) 67 (69.1%), phacoemulsification surgery technique 97 (100%), unilaterally operated eyes on the left eye 35 (36.1%), nuclear cataract morphology 73 (75.3%), pre-operative vision dominated by moderate vision 62 (63.9%), post-operative vision on day 1 mild vision 51 (52.6%), day 7 mild vision 81 (83.5%) and day 30 it improved and increased in 86 (88.7%). Research result Visual Outcome Senile Cataract Patients Post Cataract Surgery at JEC-Orbita Makassar Main Eye Clinic from January 2024 to June 2024 showed improvement at the end of the fourth week of visits, by looking at the vision before and after cataract surgery.

Introduction

Cataract is a leading cause of blindness worldwide. Approximately 90% of cataract disease cases are age-related and other causes such as systemic diabetes mellitus (DM), smoking and trauma. According to the Global Burden of Disease study, cataracts remain the leading cause of global blindness. Data from the World Health Organization (WHO) in 2020, cataracts are the most common eye disorder causing blindness and visual impairment. Postoperative visual acuity is a simple direct parameter that can reflect the quality of cataract surgery and postoperative care to a large extent. The outcome of cataract surgery is independent of preoperative visual acuity. An observational study at Al Ibrahim Eye Hospital (AIEH), Karachi, achieved WHO criteria for "good visual outcome" (6/6 to 18/6) of 81.83% which is close to the recommendation of $\geq 90\%$ and severe visual impairment of 4.26% (Ahsan, 2021).

Most, 283 (90.1%) had preoperative visual acuity $<6/60$. At the last visit at 6 weeks, Best corrected visual acuity (BCVA) was good ($\geq 6/18$) in 215 (68.5%), and poor ($<6/60$) in 36

(11.5%) (Markos, 2020). The most common surgery performed is manual small incision cataract surgery (MSICS) (Warad, 2021). Subjective improvement in visual function was assessed preoperatively and 6 weeks postoperatively (Mittal, 2019). However, there have been unfavorable reports of cataract surgery outcomes with poor visual acuity ranging from 11.4% to as high as 44%. Risk factors identified in some of these studies include age, uneducated and the presence of aphakia (Kanclerz, 2021). These studies conclude that the average visual acuity outcome after cataract surgery is "good". However, there are several factors related to the results of cataract surgery with poor visual acuity results (Yong et al., 2022). Therefore, researchers want to know the description of visual outcomes in postoperative senile cataract patients at the JEC-ORBITA Main Eye Clinic Makassar.

Methods

This study is an observational study with a descriptive cross-sectional method that aims to determine the visual outcome of senile cataract patients after surgery at the JEC-ORBITA Main Eye Clinic Makassar, using medical records as research data. Place and Time This research was conducted at the Main Eye Clinic JEC-ORBITA Makassar, in September 2024. The population in this study were senile cataract patients after cataract surgery at the JEC-ORBITA Main Eye Clinic Makassar and the sample in this study were all patients diagnosed with senile cataract at the JEC-ORBITA Main Eye Clinic Makassar from January 1, 2024 to June 30, 2024, totaling 3466. For sample withdrawal using the slovin formula with a large error of 0.1 of the population size. Data collection methods were carried out using secondary data obtained from records on medical records of patients after senile cataract surgery. And the data collected was processed manually using the SPSS 16.0 computer program and Microsoft Excel to obtain the expected descriptive statistical results.

Results and Discussion

Research conducted at the Main Eye Clinic JEC-ORBITA Makassar City for the period January 2024 - June 2024 in patients diagnosed with senile cataracts was found to be 3466 patients. The population in this study were senile cataract patients after cataract surgery. For sample withdrawal using the slovin formula with the total sample needed in this study of 97 samples. The sampling technique uses the random sampling method by taking into account the inclusion criteria and exclusion criteria. All respondent data were taken from secondary data, namely medical records consisting of the type of surgery technique, age, cataract morphology, visus before surgery and visus after surgery.

Frequency Distribution of Patients Based on Gender

Based on table 1 frequency distribution of patients based on gender. Most senile cataract patients were female as many as 54 (55.7%) while 43 (44.3%) were male.

Table 1. Frequency Distribution of Patients Based on Gender

Age	n	%
Male	43	44.3
Female	54	55.7
Total	97	100%

Source: Obtained by the Author with SPSS, 2024

Frequency Distribution of Patients Based on Age

Based on table 2 frequency distribution of patients based on age, the subjects of this study were individuals aged ≥ 45 years. Based on WHO age category criteria, 17 patients (17.5%) were in middle age, 67 patients (69.1%) were elderly, and 13 (13.4) were entering old age. The youngest age was 45 years old and the oldest age was 88 years old. Age data was obtained based on data contained in the medical records of postoperative senile cataract patients.

Table 2. Frequency Distribution of Patients by Age

Age	n	%
Mid-age (45-59 years old)	17	17.5
Advanced age (60-74 years old)	67	69.1
The elderly (75-90 years old)	13	13.4
Total	97	100%

Source: Obtained by the Author with SPSS, 2024

Frequency Distribution of Patients by Type of Operating Technique

Based on table 3, the frequency distribution of cataract patients based on the type of surgical technique was found that all patients diagnosed with senile cataracts at the JEC-ORBITA Main Eye Clinic in Makassar City for the period January 2024 - June 2024 were operated using the Phacoemulsification Technique, namely 97 patients (100%).

Table 3. Frequency Distribution of Patients by Type of Operating Technique

Operation Technique	n	%
Intracapsular Cataract Extraction (ICCE)	0	0
Extracapsular Cataract Extraction (ECCE)	0	0
Manual Small Incision Cataract Surgery (MSICS)	0	0
Phacoemulsification	97	100
Total	97	100.0

Source: Obtained by the Author with SPSS, 2024

Frequency Distribution of Patients Based on Laterality

Based on table 4, the frequency distribution of patients based on the laterality of the operated eye was mostly the left eye (oculi sinistra) as many as 35 eyes (36.1%), followed by both eyes (oculi dexa et sinistra) as many as 34 eyes (35.1%) and the right eye (oculi dexa) as many as 28 eyes (28.9%).

Table 4. Frequency Distribution of Patients Based on Laterality

Cataract Laterality	n	%
Oculi dexa	28	28.9
Oculi sinistra	35	36.1
Oculi dexa et sinistra	34	35.1
Total	97	100%

Source: Obtained by the Author with SPSS, 2024

Frequency Distribution of Patients Based on Cataract Morphology

Based on table 5, the frequency distribution of patients based on cataract morphology, 73 eyes (75.3%) were found to have nuclear opacities, 20 eyes (20.6%) cortical and 4 eyes (4.1%) subcapsular.

Table 5. Frequency Distribution of Patients Based on Cataract Morphology

Cataract Morphology	n	%
Nuklear	73	75.3
Cortical	20	20.6
Subcapsular	4	4.1
Total	97	100%

Source: Obtained by the Author with SPSS, 2024

Frequency Distribution of Patients Based on Visual Outcome

Based on table 6, the frequency distribution of patients based on pre-operative and postoperative vision in senile cataract patients who routinely control the postoperative eye clinic on day 1, day 7 and at the last visit on day 30 with or without correction using glasses. Preoperative senile cataract patients were dominated by moderate vision, namely 62 eyes (63.9%) and followed by severe vision as many as 15 eyes (15.5%), blindness as many as 15 eyes (15.5%) and mild vision only as many as 5 eyes (5.2%).

On postoperative day 1, 51 eyes (52.6%) were dominated by the mild visus group, followed by moderate visus of 21 eyes (21.6%), blindness of 13 (13.4%) and severe visus criteria of 12 eyes (12.4%). On the 7th postoperative day, it was found that the mild visus group still dominated as many as 81 eyes (83.5%) followed by moderate visus 14 eyes (14.4%), severe visus 1 eye (1.0%), and blindness 1 eye (1.0%). At the last visit on the 30th postoperative day, the visual outcome of the patients improved, which was still dominated by the mild visus group which increased in 86 eyes (88.7%), followed by moderate visus in 10 eyes (10.3%), severe visus in 1 eye (1.0%), and blindness in none.

Table 6. Frequency Distribution of Patients Based on *Visual Outcome*

Evaluation Time	Visus Criteria								Total	
	Lightweight (6/12 - 6/18)		Medium (<6/18 - 6/60)		Weight (<6/60 - 3/60)		Blindness (<3/60)			
	n	%	n	%	n	%	n	%	n	%
Pre-Operation	5	5.2	62	63.9	15	15.5	15	15.5	97	100.0
Post-Operation Day 1	51	52.6	21	21.6	12	12.4	13	13.4	97	100.0
Post-Operation Day 7	81	83.5	14	14.4	1	1.0	1	1.0	97	100.0
Post-Operation Day 30	86	88.7	10	10.3	1	1.0	0	0.0	97	100.0

Source: Obtained by the Author with SPSS, 2024

Senile Cataract Patients by Gender

Based on the results of a study of 97 senile cataract patients who underwent cataract surgery, it was found that most senile cataract patients were female as many as 54 (55.7%). Women experience menopause around the age of 40, which results in a decrease in the body's metabolic ability and tissue damage. The hormone estrogen has a role to protect the lens from cataractogenesis so that with increasing age the role of estrogen decreases rapidly due to menopause which results in a high risk of cataracts. In line with Zhang et al. (2024) research, it shows that gender is a significant risk factor for the incidence of senile cataracts, which is 2.773 times higher in female patients than male. Kodera et al. (2020) in his research in Sweden with 243 subjects consisting of 139 women and only 95 men showed that senile cataracts were influenced by gender. However, in a study conducted by Eric et al. (2023) the male gender dominated by 109 patients (56.48%).

Senile Cataract Patients by Age

Based on the results of a study of 97 senile cataract patients who underwent cataract surgery, it was found that the largest age group was the elderly (60-74 years) as many as 67 patients (69.1%). The aging process causes the lens to become hard and cloudy. In accordance with increasing age, subepithelial lamellar fibers continue to be produced so that the lens gradually becomes larger and less elastic so that the accommodation ability of the eye decreases. Changes appeared at the beginning of the age of 50 years, then doubled at the age of 65 years and finally tripled when the age reached 77 years. These results are the same as research conducted by Nanda et al. (2019) on senile cataract patients at RSI Siti Rahmah in 2017 found that most cataract patients are aged 60-69 years.

Karnataka tertiary hospital, India, found that the age of cataract patients who performed the most cataract surgery was 60-69 years align with research from Shambhu et al. (2022). Wetarini, et al (2020) in their research at Wangaya Hospital, Bali found that the most common cataract patients were aged 60-69 years. This is also in line with research conducted by Nanda, et al (2023) on senile cataract patients at Mangusada Badung Regional Hospital for the 2018 period where out of 609 patients, 317 of them were aged 60-69 years. Research from Fang, et al (2022) states that the risk of developing cataracts increases with age, from 3.9% at the age of under 60 years to 92.6% when reaching the age of 80 years.

In a study conducted by Narayan et al (2023), it was found that there was no relationship between age and the action to perform cataract surgery. Respondents with the age category of the elderly (>60 years) and non-elderly (<60 years) all decided to perform cataract surgery with a percentage of 89.74% for the elderly while for the non-elderly age category it had a percentage of 90.47%. In this study as a whole, respondents who fell into the elderly category (65%) were more than non-elderly (35%).

Senile Cataract Patients by Type of Surgical Technique

Based on the results of a study of 97 senile cataract patients undergoing cataract surgery, all patients used the Phacoemulsification Technique, namely 97 patients (100%). In line with the development of medical science and technology, cataract surgery has undergone drastic changes (Gutierrez et al., 2022). Today, phacoemulsification is the most commonly used cataract surgery technique. This technique uses a handheld ultrasonic vibrator to crush the hard nucleus so that the substance of the nucleus and cortex can be aspirated through an incision measuring 1.8 mm - 2.75 mm. The size of the incision is sufficient to insert a *foldable* intraocular lens. Surgery for cataract treatment is necessary to remove or clear the cloudy lens so that visual function can be restored. The aim of phacoemulsification is to achieve uncorrected sharp vision with fast recovery time and minimal surgical complications. However, phacoemulsification may lead to intraoperative and postoperative complications.

In line with research conducted by Lu & Zhu (2021), phacoemulsification is one of the most widely performed cataract surgeries. With this technique, the lens nucleus is crushed and emulsified with an ultrasonic vibrator. Phacoemulsification is widely practiced because it is more efficient and the healing period is relatively faster (Wang et al., 2022). From 89 medical records, all patients with senile cataract underwent phacoemulsification.

Based on the existing literature, SICS is a variation of extracapsular cataract extraction (ECCE) which is an incisional procedure on the sclera. This surgery can be used at all stages, while phacoemulsification is a surgical technique that uses machines and micro-surgical instruments. A total of 350 patients were indicated for the SICS procedure, and 66 patients were indicated for the phacoemulsification procedure. According to Bharucha et al (2020), there is no significant difference between the SICS and phacoemulsification procedures in terms of outcome or sharp vision, but the SICS procedure is generally faster to perform. In terms of endothelial cell count (ECC) reduction, there was also no significant difference between SICS and phacoemulsification, nor with ECCE. Therefore, the SICS procedure is the most common procedure performed in the operative management of senile cataract patients at Mangusada Badung Hospital followed by the phacoemulsification procedure.

Senile Cataract Patients by Laterality

Based on the frequency of patients based on laterality, the most operated eye was unilateral in the left eye (*oculi sinistra*) as many as 35 eyes (36.1%), followed by both eyes (*oculi dextra et sinistra*) as many as 34 eyes (35.1%). Kekunnaya et al. (2020) showed that the proportion of senile cataract patients in both eyes (bilateral) was the most dominant at 68.5%. If it occurs unilaterally, one of the other eyes will have a high risk of cataracts in the future, obtained at

68.5% which affects both eyes. However, Lei Zuo showed that there were 153 patients with unilateral senile cataract and 145 patients with bilateral senile cataract. In this study on the effect of unilateral or bilateral cataract surgery on sharp vision and quality of life, participants with surgery in both eyes at intervals of 2 to 3 weeks were taken.

Senile Cataract Patients based on Cataract Morphology

When viewed based on cataract morphology, most of the 73 eyes (75.3%) had nuclear opacities. In line with Vashist et al. (2016) research, it shows that out of 85 research samples, most of the opacities were in the nuclear location of 47 (55.3%). According to Alabdulwahhab (2022), the prevalence of senile cataract type that occurred most in senile cataract patients at Andalas University Hospital in 2020 was nuclear cataract, namely in 46 eyes (59.7%), while the least was subcapsular cataract, namely in 12 eyes (15.6%). Nuclear cataracts are a type of cataract that develops slowly and can take up to several years to impair vision. Nuclear cataracts usually occur due to the aging process and depend on the severity of the initial stage, the incidence of cataract surgery, or differences in measurement scale intervals (Garcin et al., 2020). In contrast to Kumari's research (2024), there are three types of Senile cataracts based on the location of opacities, namely the nuclear type (25%), cortical type (70%), and posterior subcapsular type 5%.

Senile Cataract Patients based on Pre-Operative Visus

In table and graph 1.6 preoperative and postoperative phacoemulsification visus above shows the percentage of vision evaluation in 97 eyes of senile cataract patients who performed cataract surgery using the phacoemulsification technique at the Main Eye Clinic JEC-ORBITA Makassar City, data on preoperative visus, postoperative day 1, postoperative day 7, postoperative day 30.

Based on the research data before surgery, it was found that the highest percentage was dominated by moderate vision, namely 62 eyes (63.9%) and followed by severe vision as many as 15 eyes (15.5%), blindness as many as 15 eyes (15.5%). In line with research by Melinda et al. (2021) at Sanglah Central General Hospital there were 24.7% mild visual impairment, 39.7% moderate visual impairment, 17.8% severe visual impairment, and 17.8% blindness. Alamgir et al. (2020) also showed that the most sharp vision results were in the moderate category ($6/18 > UCVA > 6/60$) as many as 75 patients (38.1%) in the immature stage.

However, in a study conducted by Flaxman et al. (2021) showed that the sharpest visual results were in the blindness category ($> 3/60$) as many as 65 (43.3%). Obame et al. (2021) in their research showed that the most sharp visual results were in the poor category ($< 6/60$) as many as 349 (60.6%). Zhang et al. (2017) in his research before surgery, showed the most sharp visual results, namely 60 (38.2%) eyes had a visus of 6/18 and better.

Senile Cataract Patients Based on Postoperative Visus

Based on the research data on day 1 after surgery, it was dominated by the mild visus group, namely 51 eyes (52.6%), followed by moderate visus as many as 21 eyes (21.6%). In line with research conducted by Kudsi et al. (2022) the most postoperative group on day 1 was in the good category 51 (44.3%). Németh, et al (2021) in his research also showed the results of sharp vision of the most postoperative group on day 1, namely the good category 249 (43.5%).⁵³ In contrast to Flores et al. (2022) research visus on postoperative day 1 was dominated by the moderate visus group which increased by 91.30% with a difference of 78.26% to preoperative visus. Poor results ($< 6/60$) occurred in 29.2% within 48 hours after surgery and 9.5% at 4-6 weeks follow-up (Bedawi et al., 2023). Almost half of the operated eyes had unfavorable results ($6/24-6/60$) within 48 hours after surgery and at follow-up.

Based on the research data on day 7 after surgery, the mild visus group still dominated as many as 81 eyes (83.5%) followed by moderate visus 14 eyes (14.4%). In line with research

conducted by Van et al. (2021) the most postoperative group on day 7 was the good category 85 (73.9%). Brown et al. (2021) in his research also showed the results of sharp vision of the most postoperative group on day 7, namely the good category 224 (44%). In contrast to Li et al. (2020) research, the visus at week 1 postoperatively was still dominated by the moderate visus group with the same value as day 1 postoperatively, namely 91.30%, the good visus group slightly increased by 5.88%.

Based on the research data on day 30, the mild visus group still dominates in 86 eyes (88.7%), followed by moderate visus 10 eyes (10.3%), severe visus 1 eye (1.0%), and blindness does not exist. In line with research conducted by Van et al. (2021) the most postoperative group on day 30 was in the good category 97 (84.3%). Brown et al. (2021) in his research also showed the results of sharp vision of the most postoperative group on day 30, namely the good category 170 (38.5). The results of this study are in line with the results of research conducted by Miller et al. (2021) through his research on 842 eyes of cataract patients obtained good visus results after the 4th postoperative week with the Phacoemulsification technique. Hsu et al. (2022), in Thailand, obtained results at 1 month after phaco surgery VA 6/6 - 6/18 as many as 417 cases (86.33%) and VA < 6/18 - 6/60 as many as 55 cases (11.39%). There was an increase in VA after phacoemulsification surgery, where VA less than 6/60 was reduced from 36.15% to 2.28%, while VA >6/18 from only 2.36% to 83.6% in the month after surgery.

Akpolat et al. (2022) in their study at 1 month after phaco, 4 (2.5%) eyes visual acuity was <6/60, 8 (5.1%) eyes were between 6/60 and <6/18, while 145 (92.4%) eyes had 6/18 and better. Taggart et al. (2021) at week 3 postoperatively, the good vision group increased by 60.8% with a difference of 52.17% from week 1 postoperatively. The poor vision group increased again by 4.35%. During this period, 6 eyes were given glasses to help their vision.

In univariable analysis, poor outcomes were associated with the presence of ACIOL/No IOL, intraoperative complications and associated ocular comorbidities. However, in multivariable analysis, the only significant factor was the presence of ocular comorbidities. This is similar to reports from other studies. This suggests that a good preoperative comprehensive eye examination by a trained ophthalmologist is necessary to identify ocular comorbidities that might affect the outcome. Patients with ocular comorbidities can then be counseled with a clear explanation of the surgical outcome.

In phacoemulsification surgery, there is a duration of the operation (phaco time) which will affect the healing process of the surgical wound. If the duration of phaco time is not correct, the surgical wound healing is not perfect, this will affect the refractive media and result in changes in vision. In addition, endothelial damage during surgery will affect the wound healing process which will affect the patient's vision improvement.

From all that has been described, it can be concluded that senile cataract patients after cataract surgery at the main eye clinic JEC-Orbita Makassar for the period January 2024 to June 2024 obtained improved vision, by looking at the vision before and after cataract surgery. However, at the last visit on day 30 there were still moderate visus in 10 eyes (10.3%) and severe visus in 1 eye (1.0%), this needs to be further reviewed regarding the less than optimal results and risk factors that can cause no improvement in vision, as explained by the author, can be related to comorbid factors, intraoperative complications, phaco time, and others.

Conclusion

Based on the description of the results of research and discussion of medical record data of senile cataract patients who routinely control the Eye Clinic until the fourth week after cataract surgery with or without correction using glasses at the Main Eye Clinic JEC-ORBITA Makassar City for the period January 2024 - June 2024, it can be concluded that the characteristics of 97 senile cataract patients who underwent cataract surgery at the Main Eye

Clinic JEC-ORBITA Makassar City, were dominated by female gender as many as 54 (55.7%) and the highest age category (60-74 years) as many as 67 patients (69.1%). All patients diagnosed with senile cataracts at the JEC-ORBITA Main Eye Clinic in Makassar City from January 2024 to June 2024 were operated on using the Phacoemulsification Technique, totaling 97 eyes (100%). The highest number of operated eyes was unilateral on the left eye (oculi sinistra) as many as 35 eyes (36.1%), followed by bilateral (oculi dextra et sinistra) as many as 34 eyes (35.1%).

Based on the morphology of cataracts divided into nuclear, cortical and subcapsular, 73 eyes (75.3%) were found to have the most opacities in the nuclear location. The vision in 97 eyes of cataract patients before undergoing cataract surgery was dominated by the moderate vision category, namely 62 eyes (63.9%). Visus in 97 eyes of cataract patients after undergoing cataract surgery on day 1 was dominated by mild visus in 51 eyes (52.6%), day 7 mild visus still dominated in 81 eyes (83.5%) and the last visit on day 30 mild visus still dominated and increased in 86 eyes (88.7%).

Suggestion

From the results of the research conducted, there are several suggestions that might be useful, namely It is recommended for patients to carry out routine postoperative controls according to a predetermined schedule. It is suggested to the clinic that the results of this study can be used as epidemiological data for the Main Eye Clinic JEC-ORBITA Makassar City.

Acknowledgment

With gratitude to Allah SWT, and with the help of various parties, the author expresses many thanks to those who have supported and provided assistance so that this research can be completed properly. Hopefully this research will increase knowledge for readers.

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