COMPARISON OF THE QUALITY OF LIFE OF PATIENTS PRE- AND POST-SENILE CATARACT SURGERY WITH PHACOEMULSIFICATION TECHNIQUE AT PHC HOSPITAL SURABAYA

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ABSTRACT

Background*: Cataract is an eye disease that causes the eye's clear lens to become cloudy. This results in visual impairment and reduces a person's quality of life. Cataracts impair a person's ability to see at a distance, resulting in impediments to mobility related to dependency, such as the ability to recognize people and to see and avoid obstacles on the road. Cataracts can also impair a person's ability to see at close range. Cataract patients can therefore experience difficulty in performing activities such as dressing, reading, and sewing. One way to treat cataracts is by performing cataract surgery using the phacoemulsification technique. This surgery allows the lens to heal naturally without the need for stitches, enabling the patient to resume their daily activities and improve their quality of life.* ***Objective****: To find the difference in quality of life between pre- and post-senile cataract surgery patients using phacoemulsification technique at PHC Surabaya Hospital.* ***Method****: Quality of life scores were collected using a quality of life research questionnaire for senile cataract patients, containing 25 question items divided into 11 subscales. Data collection will be carried out twice: before phacoemulsification cataract surgery and 8 weeks after phacoemulsification cataract surgery.* ***Results****: There is a significant difference between pre- and post-cataract surgery quality of life using phacoemulsification technique, based on the quality of life research questionnaire for senile cataract patients at PHC Surabaya Hospital, with the result (P = 0.000).* ***Conclusion****: There is a significant difference in the quality of life between pre- and post-phacoemulsification cataract surgery at PHC Surabaya Hospital, based on the cataract patient quality of life research questionnaire.*

Keywords*: Cataract; phacoemulsification cataract surgery; quality of life*

INTRODUCTION

Cataract is a condition in which the passage of light is impeded due to the clouding of the normally transparent lens of the eye.[1] It is a progressive disease and the leading cause of visual impairment and blindness worldwide, often associated with aging. Eyes play an important role in our daily lives. Without sight, we would have difficulty performing our activities. Visual impairment greatly affects a person's quality of life.[2]

The Global Burden of Disease in 2020 states that the majority of global blindness is caused by cataracts.[3] Indonesia ranks third in the world for blindness at 1.47% and first in Southeast Asia at 1.5%.[4]

Cataract surgery is the most effective treatment for cataracts. One of the surgical techniques that can be performed is phacoemulsification. This technique uses a smaller incision, allowing the lens to heal naturally without the need for stitches. This enables the patient to resume their activities of daily living immediately.[5]

Cataracts result in visual impairment, which can lead to a reduced quality of life. Decreased ability to see at a distance results in impeded mobility related to one's dependencies, such as the

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ability to recognize people and to see and avoid obstacles on the road. Cataracts can also impair a person's ability to see at close range. As such, cataract patients may experience difficulty in performing activities such as dressing, reading, and sewing. Cataracts can also have a negative impact on the patient's mental and social life. Thus, patients may experience feelings of isolation.[6]

In a previously conducted study, Sa'at et al. (2022) reported that some patients still experienced worsening visual impairment after cataract surgery.[7] Naderi et al. (2020) reported that visual impairment after cataract surgery remains relatively high at 40.8%. Therefore, it is important to assess quality of life scores to determine the impact experienced by patients with visual impairment. In addition, quality of life assessment serves as an indicator of success and demonstrates the optimal functioning of patients after undergoing cataract surgery.[8]

METHODS

This study uses an analytical observational research design with a prospective approach with a pretest–posttest group design. It involves one group and measures the quality of life score twice. The first measurement is taken before the group undergoes phacoemulsification cataract surgery, and the second measurement is taken after the surgery, during a follow-up visit 8 weeks postoperatively.

The samples of this study were senile cataract patients scheduled to undergo phacoemulsification cataract surgery at PHC Surabaya Hospital from July to September 2024. The sampling technique used was consecutive sampling, and the sample size was determined using the Lameshow formula, resulting in a total of 38 samples.

Data collection for pre- and post-phacoemulsification cataract surgery quality of life scores was conducted using the senile cataract patient quality of life questionnaire. The researcher recorded the data in tabular form using Microsoft Excel, and the analysis was performed using the Wilcoxon Signed Rank Test with the help of the SPSS (Statistical Product and Service Solution) version 26.

RESULTS

Table 1. Frequency and percentage distribution by age

Age Interval (years)	Frequency (n)	Percentage (%)
50–59	9	24%
60–69	16	42%
70–79	11	29%
≥80	2	5%
Total	**38**	**100%**

Table 1 shows that, in this study, the age of cataract patients scheduled to undergo cataract surgery was most commonly found in the 60–69 years age group, with 16 patients (42%). The fewest patients were in the ≥80 years age group, with 2 patients (5%).

Table 2. Frequency and percentage distribution by gender

Gender	Frequency (n)	Percentage (%)
Female	23	61%
Male	15	39%
Total	**38**	**100%**

Table 2 shows that, in this study, the number of cataract patients scheduled to undergo phacoemulsification cataract surgery was higher among females than males. There were 23 female patients (61%) and 15 male patients (39%).

Table 3. Frequency and percentage distribution based on systemic diseases

Systemic Diseases	Frequency (n)	Percentage (%)
Not Suffering	23	61%
DM, Hypertension, DM + Hypertension	15	39%
Total	**38**	**100%**

Table 3 shows that, in this study, the number of cataract patients scheduled to undergo

phacoemulsification cataract surgery who did not have systemic diseases was greater than those who did. There were 23 patients without systemic diseases (61%) and 15 patients with systemic diseases (39%).

Table 4. Comparison of quality of life after phacoemulsification cataract surgery based on systemic diseases

Two Sample T Test					
Groups					
Normal	Not suffering from systemic diseases		Suffering from Systemic Disease		Asymp. Sig. (2-Tailed)
Quality of life after phacoemulsificati on cataract surgery	Mean± SD	N	Mean± SD	N	
	121.05 ±3.87	20	121.66 ± 2.44	18	0.556

Table 4 shows that, in this study, the average value of postoperative quality of life between patients with and without systemic diseases were nearly the same, based on the independent samples t-test. There was no significant difference between the two groups ($p > 0.005$).

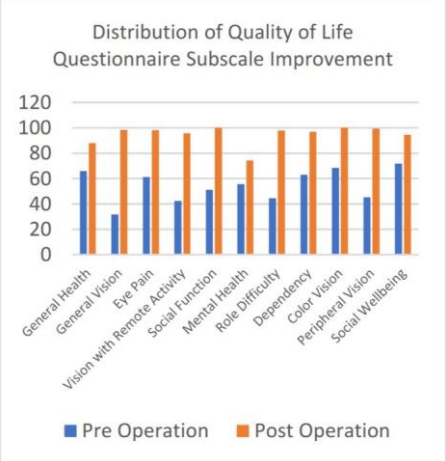

Figure 1. Distribution of improvement in patient quality of life based on subscales of the quality of life research questionnaire for senile cataract patients

Graph 1 shows that, based on the results of the study, there was an increase in the average quality of life scores according to the quality of life research questionnaire for senile cataract patients, as follows:

- General health subscale: from 65.79 to 87.89.
- General vision subscale: from 31.58 to 98.42.
- Eye pain subscale: from 61.23 to 98.24.
- Distance activity vision subscale: from 42.24 to 95.66.
- Social function subscale: from 51.05 to 100.
- Mental health subscale: from 55.53 to 74.34.
- Role difficulty subscale: from 44.47 to 97.89.
- Dependency subscale: from 62.98 to 96.84.
- Color vision subscale: from 68.42 to 100.
- Peripheral vision subscale: from 45.26 to 99.47.
- Social well-being subscale: from 71.75 to 94.56.

Table 5. Comparative analysis of pre- and post- cataract surgery quality of life with phacoemulsification technique based on the quality of life research questionnaire for senile cataract patients at PHC Surabaya hospital

Wilcoxon Signed Rank Test				
	N	Mean Rank	Sum of Ranks	Asymp. Sig. (2-Tailed)
Quality of Life Post-Cataract Surgery – Quality of Life Pre-Cataract Surgery Cataract-	38	19.50	741.00	0.000

Table 5 shows that the non-parametric Wilcoxon Signed Rank Test obtained a p value of 0.000, which means $p < 0.005$. Based on the comparison between the mean preoperative and postoperative quality of life scores, there was a significant increase. Each subscale assessed showed an improvement in the quality of life experienced by patients who underwent senile cataract surgery using the phacoemulsification technique at PHC Surabaya Hospital.

Table 6. Frequency and percentage distribution based on the operated eye

Operated Eye	Frequency (n)	Percentage (%)
First Eye	23	61%
Second Eye	15	39%
Total	**38**	**100%**

Table 6 shows that, in this study, more patients underwent phacoemulsification cataract surgery on

the first eye than on the second eye. A total of 23 patients (61%) had surgery on the first eye, while 15 patients (39%) had surgery on the second eye.

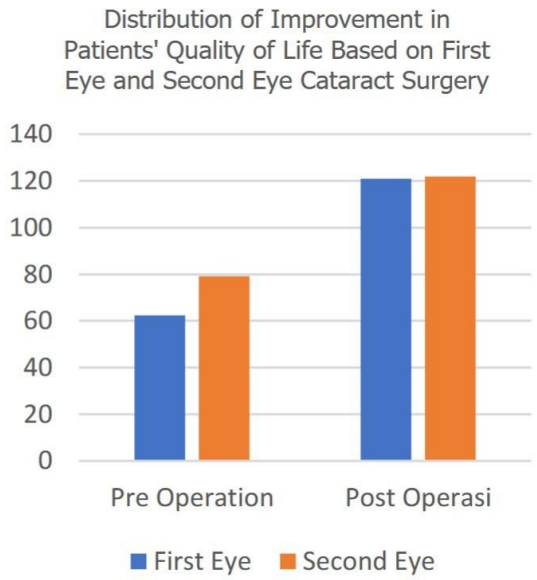

Figure 2. Distribution of improvement in patients' quality of life based on first eye cataract surgery and second eye cataract surgery

Graph 2 shows that, in this study, patients who underwent phacoemulsification cataract surgery on the first eye had an average preoperative quality of life score of 62.4, which falls into the poor quality of life category. In contrast, patients undergoing surgery on the second eye had a higher average preoperative quality of life score of 79.13, categorized as good quality of life. Postoperatively, patients who had first-eye surgery had an average quality of life score of 120.96, indicating a very good quality of life, while those who had second-eye surgery scored slightly higher at 121.93, also within the very good quality of life category.

Table 7. Comparative analysis of quality of life pre- and post-phacoemulsification cataract surgery in the first eye

Wilcoxon Signed Rank Test				
	N	**Mean Rank**	**Sum of Ranks**	**Asymp. Sig. (2-Tailed)**
Quality of Life Post-Cataract Surgery -Quality of Life Pre-Cataract Surgery Cataract-	23	12.00	276.00	0.000

Table 7 shows that the non-parametric Wilcoxon Signed Rank Test yielded a *p* value of 0.000, indicating $p < 0.005$. Based on the comparison between the mean preoperative and postoperative quality of life scores for patients who underwent surgery on the first eye, there was a significant increase.

Table 8. Comparative analysis of quality of life pre- and post-phacoemulsification cataract surgery in the second eye

Wilcoxon Signed Rank Test				
	N	**Mean Rank**	**Sum of Ranks**	**Asymp. Sig (2-Tailed)**
Quality of Life Post-Cataract Surgery Quality of Life Pre-Cataract Surgery Cataract-	15	8.00	120.00	0.001

Table 8 shows that the non-parametric Wilcoxon Signed Rank Test yielded a *p* value of 0.001, indicating $p < 0.005$. Based on the comparison between the mean preoperative and postoperative quality of life scores for patients who underwent surgery on the second eye, there was a significant increase.

Table 9. Distribution of quality of life improvement based on subscales of the quality of life research questionnaire for senile cataract patients in first eye surgery and second eye surgery

First Eye Surgery				
Subscale	**Question Item**	**Pre-Operation**	**Post-Operation**	**N**
		Mean ± SD	**Mean ± SD**	
General Health	1	65.21±25.02	88.69±22.42	23
General Vision	2	31.30±10.13	98.26±5.76	23
Eye Pain	4,5,16	61.15±10.57	97.39±5.59	23
Vision with Remote Activity	6,7,12,13	41.30±15.16	93.91±8.11	23
Social Function	9,11	52.60±21.78	100	23
Mental Health	3,18,19,22	60.65±16.39	99.13±3.25	23
Role	14,15	44.34±18.78	96.95±8.22	23

Difficulty				
Dependency	17,20,21	67.24±25.81	97.97±5.83	23
Color Vision	10	71.30±26.85	100	23
Peripheral Vision	8	42.60±18.39	99.13±17.39	23
Social Well-being	23,24,25	72.75±13.32	93.91±52.17	23

Second Eye Surgery

Subscale	Question Item	Pre-Operation	Post-Operation	N
		Mean ± SD	Mean ± SD	
General Health	1	66.66±26.90	90.66±18.30	15
General Vision	2	32±10.14	98.66±5.16	15
Eye Pain	4,5,16	60±8.72	96.44±6.60	15
Vision with Remote Activity	6,7,12,13	38±13.86	93±8.82	15
Social Function	9,11	50.66±26.58	100	15
Mental Health	3,18,19,22	59.66±17.67	98.66±3.99	15
Role Difficulty	14,15	42±25.69	96.66±8.99	15
Dependency	17,20,21	63.11±28.60	97.33±7.03	15
Color Vision	10	72±29.08	100	15
Peripheral Vision	8	41.33±20.65	100	15
Social Well-being	23,24,25	71.55±14.57	93.77±8.53	15

Table 9 shows that, based on the results of the study, there was an increase in the average quality of life subscale scores following both first-eye and second-eye surgeries.

DISCUSSION

In this study, the age group most commonly undergoing phacoemulsification cataract surgery was 60–69 years, while the least common was ≥80 years. This is in line with the March 2023 *Susenas* data conducted by the Central Statistics Agency (2023), which reported that 63.59% of the elderly are classified as young elderly (60–69 years), and 8.65% as old elderly (>80 years).[9] Motris et al. (2024) stated that increasing age makes lens proteins susceptible to oxidative processes, leading to molecular changes in the lens and increased light scatter. Long-term exposure to oxidative stress can reduce lens transparency and elasticity.[10]

Based on the data obtained in this study, there were more female patients than male patients. Research conducted by Ariani et al. (2023) states that women who have undergone menopause experience a decrease in estrogen levels. This hormone is mitogenic and antioxidative toward human lens epithelial cells, which play a role in protecting the lens from cataract formation.[11]

Based on the data obtained in this study, the number of patients without systemic diseases was greater than those with systemic diseases. According to research conducted by Hidayaturahmah et al. (2021), the presence of comorbidities in cataract patients can reduce quality of life. The accumulation of intracellular sorbitol compounds can trigger hyperosmolarity in the lens, leading to the formation of fibers that cause the lens to become cloudy.[6]

Based on the comparative analysis of quality of life after phacoemulsification cataract surgery between patients with and without systemic diseases, the p value was 0.556 ($p > 0.005$). This indicates that there was no significant difference in postoperative quality of life between the two groups. Thus, systemic disease as a confounding factor in this study can be ruled out.

Based on the data obtained in this study, the average quality of life score across subscales of the patient quality of life research questionnaire showed a statistically significant increase, with a mean score of 94.85 in each domain, categorized as very good. However, this finding contrasts with the study conducted by Ngoune et al. (2023), which reported an average postoperative score of 46.5 for the general health subscale. This difference may be due to the fact

that, in their study, most patients had a history of comorbidities.[12]

In this study, the average preoperative score of the general vision subscale was 31.58, while the average postoperative score was 98.42. According to research conducted by Juanarta et al. (2022), patients with worse visual acuity tend to experience significant improvement following surgery. Cataract surgery significantly improves patients' ability to see during distance activities, perceive colors, and detect peripheral vision.[13]

Dhawale et al. (2024) state that cataract surgery has a significant impact on mental health, including reductions in depression, anxiety, and cognitive decline. Improved visual acuity can also improve patient independence, and overall psychological well-being. Patients experience increased self-confidence and self-esteem as they regain the ability to participate in daily activities and social interactions, resulting in reduced feelings of isolation and loneliness.[14]

Based on the Wilcoxon Signed Rank Test, there was a significant difference in the comparison of pre- and post-cataract surgery quality of life using phacoemulsification technique, as measured by the quality of life research questionnaire for senile cataract patients at PHC Surabaya Hospital, with a value of $p < 0.005$ ($p = 0.000$). Cataract surgery not only improves visual function but also has a positive impact on various dimensions of health-related quality of life (HRQOL), including better physical health and emotional well-being.

In this study, more patients underwent phacoemulsification cataract surgery in the first eye than in the second eye. Tanjung R. (2022) stated that the visual outcomes of cataract surgery generally yield highly satisfactory results and lead to a high level of patient satisfaction with first-eye surgery, which often causes patients to delay cataract surgery in the second eye.[15]

Patients who underwent cataract surgery in the first eye showed a greater difference in quality of life scores compared to those who underwent surgery in the second eye. Lisnawati et al. (2020) stated that patients with a preoperative average score above 70 already have a good level of quality of life. Therefore, the improvement in quality of life after cataract surgery may not be as clearly observable in these patients.[16]

CONCLUSION

Based on the results of the study comparing the quality of life of senile cataract patients before and after phacoemulsification cataract surgery at PHC Surabaya Hospital, the following conclusions can be drawn:

1. Patients' quality of life before phacoemulsification cataract surgery had a mean score of 55.2.
2. Patients' quality of life after phacoemulsification cataract surgery had a mean score of 97.07.
3. There is a significant difference in quality of life before and after phacoemulsification cataract surgery at PHC Surabaya Hospital, based on the cataract patient quality of life research questionnaire ($p = 0.000$).

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