Tański, W., Stapkiewicz, A., Szalonka, A., Głuszczyk-Ferenc, B., Tomasiewicz, B., & Jankowska-Polańska, B. (2023). THE FRAMEWORK OF THE PILOT PROJECT FOR TESTING A TELEMEDICINE MODEL IN THE FIELD OF CHRONIC DISEASES – HEALTH CHALLENGES AND JUSTIFICATION OF THE PROJECT IMPLEMENTATION. *Polski Merkuriusz Lekarski*, *51*(6), 674–681. https://doi.org/10.36740/Merkur202306115

Trafalska, A., & Pawlik, K. (2022). Possibilities concerning the telerehabilitation of children with developmental age disorders and evaluation of such a therapy by their parents. *E-Methodology*, *9*(9), 72–78.

Walczak, R., Kludacz-Alessandri, M., & Hawrysz, L. (2022). Use of Telemedicine Technology among General Practitioners during COVID-19: A Modified Technology Acceptance Model Study in Poland. *International Journal of Environmental Research and Public Health*, *19*(17), 10937. https://doi.org/10.3390/ijerph191710937

Waszkowski, R., Nowicki, T., & Chodowska Wasilewska, A. (2022). *Designing and Implementing Simulation Exercises for State Sanitary and Epidemiological Service*. 13th International Conference on Applied Human Factors and Ergonomics (AHFE 2022). https://doi.org/10.54941/ahfe1001632

WHO. (2024). *Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models*. World Health Organization. https://iris.who.int/handle/10665/375579

Wójta-Kempa, M., & Wolska-Zogata, I. (Eds.). (2020). *Zdrowie kobiet: Ujęcie interdyscyplinarne*. Wydawnictwo Continuo.

WHO. (2016). *Education and training*. World Health Organization. https://iris.who.int/handle/10665/252271

Zayapragassarazan, Z., & Kumar, S. (2016). Awareness, knowledge, attitude and skills of telemedicine among health professional faculty working in teaching hospitals. *Journal of Clinical and Diagnostic Research: JCDR*, *10*(3), JC01.

Zybertowicz, A., & Piekutowski, J. (2022). *Cyber kontra real: Cywilizacja w techno-pułapce* (S. Maksymowicz, Ed.). Wydawnictwo Nowa Konfederacja.

Quality of life in patients after cataract operation

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Abstract

Aim. The study aim was to perform a complex analysis how cataract operation influences patients' quality of life. Different aspects of QoL were assessed such as: vision acuity, daily life comfort, and social and emotional functions in order to further improve patients' care and expand knowledge.

Methods. The study group included 100 patients (45 men and 55 women) of the SPEKTRUM ophtalmology clinical hospital who underwent operation of cataract removal. Two proprietary questionnaires were used as well as WHOQOL-Bref and AIS questionnaires.

Results. Patients' quality of life after operation was above the mean (>50 points) in all domains. The physical domain score was the lowest (54 points) while the social domain – the highest (70 points). Quality of life did not depend on gender but correlated inversely with age. In 93 patients over 50 the correlation was statistically significant in all domains of WHOQOL-Bref scale (rho range from -0,444 to -0,594). Quality of life was significantly higher also in patients with higher education, living in towns, singles and living with families or partners.

Conclusions. The physical domain score in the WHOQOL-Bref scale was the worst because of advanced age and comorbidities but patients' engaging in social activities improved their well-being and self-acceptance. The majority of them reported satisfaction with the results of operation and general lack of complications. Their ability to perform daily activities improved considerably which eliminates pre-existing barriers and handicaps.

Keywords: quality of life, cataract operation, WHOQOL-Bref scale, AIS scale

Introduction

According to the World Health Organization, cataract ranks first as a cause of reversible blindness in the world. Cataract is a congenital or degenerative disease leading to clouding of the lens of the eye. Over the last few decades, there has been enormous progress in the surgical treatment of this disease. Cataract removal with implantation of an artificial intraocular lens is perhaps the most effective surgical procedure (Kański, 1997).

Cataract surgery is one of the most frequently performed surgical procedures in the world, especially in the elderly population (Benjamin, 2007). Due to the aging of societies and the increase in people's life expectancy, the number of such surgeries is constantly growing. Cataract surgery is usually an effective and safe procedure, leading to improved vision in patients. However, in addition to assessing the clinical effectiveness of the procedure, it is also important to understand the impact of cataract surgery on the quality of life of patients (Benjamin, 2007).

Cataracts are responsible for more than half of cases of significant visual impairment. It is estimated that by 2030, cataract requiring surgical treatment will occur in 25% of people over 65 years of age and in as many as 50% of people over 80 years of age (Szymor, Frątczak & Jurowski, 2015).

Cataracts are the leading cause of curable blindness worldwide, with 35% of people with vision problems having lost their vision due to cataracts. In 2020, an estimated 15 million people over the age of 50 were classified as blind (having visual acuity <3/60 or a field of vision less than 10° around central fixation), and approximately 79 million people over the age of 50 were classified as blind. The incidence of cataracts has been increasing significantly over

the last 30 years, mainly due to the increase in life expectancy of our society (Delbarre & Froussard-Maille, 2020; Pesudovs et al., 2021).

In Poland, cataracts affect 2.4% of our population, mainly over 60 years of age (Partyka & Wysocki, 2015). The number of people who lose their eyesight due to lens opacities is growing every year (Partyka & Wysocki, 2015). The only way to cure cataracts is a surgical operation, which is a reimbursed by the National Health Fund in Poland.

Unoperated cataracts reduce the quality of life and negatively affect its length. This problem particularly concerns underdeveloped countries where there are average or low incomes. The South Asian region is known for the highest number of cases of blindness caused by cataracts in the world and moderate and serious vision problems (Cicinelli et al., 2023).

Aim

The main objective of this research was to analyse the extent to which the comfort of life and the quality of functioning in social, family and professional life have improved in patients who underwent cataract removal by phacoemulsification with implantation of an artificial lens. Additional objectives were to determine socio-demographic and clinical factors influencing the quality of life assessed with the WHOQOL-BREF scale and to examine the relationship between the quality of life and acceptance of the disease according to the AIS scale. The authors also wanted to specifically determine whether the quality of life of patients with cataracts:

- deteriorates with age,
- is related to the general state of health and the presence of chronic diseases (hypertension, diabetes),
- is better in patients who have accepted the disease better, have higher education and live with their family or partner,
- is influenced by gender or genetic predisposition.

Methods

The survey was conducted in a group of 100 people who underwent cataract surgery at the Spektrum Clinical Ophthalmology Center in Wrocław. The consent of the Center's management was obtained. The study used a method of a diagnostic survey using questionnaire tools. All questions in the questionnaire were closed-ended and anonymous. The study was conducted in one stage between October 2023 and January 2024. All persons participating in the study expressed their informed consent to conduct an anonymous survey. The obtained results were subjected to statistical analysis. The work used two standardised questionnaires: AIS (Acceptance of Illness Scale) adapted by Juczyński and Whoqol-Bref, as well as two own surveys. There were 63 questions in total, divided into 4 domains: - somatic - psychological - social - environmental.

The own survey consists of 33 questions. Obtained data concerned: gender, age, marital status, place of residence and professional situation of the patient. The survey was constructed in a clear and transparent way. Due to their age, most of the respondents had problems with concentration, which could have contributed to the deterioration of the quality and reliability of the answers to the questions included in the survey.

The WHOQOL-BREF Test (World Health Organization Quality of Life) scale is a research tool used to assess quality of life that was designed mainly for clinical use. The WHOQOL-BREF scale contains 26 questions that are used to analyse four areas and, separately, general quality of life and self-assessment of health. This tool was adapted to Polish conditions by Wołowicka and Jaracz (Wołowicka & Jaracz, 2001).

The AIS (Acceptance of Illness Scale) scale is a psychological research tool developed in the Polish version by Juczyński. The AIS scale consists of eight statements that describe the consequences of poor health, such as: recognition of limitations imposed by the disease, lack of self-sufficiency, a sense of dependence on others and a reduced sense of self-worth. Its purpose is to measure the degree of acceptance of the disease, where greater acceptance is associated with better adaptation and a lower sense of psychological discomfort. The answers are ranked and assigned point values, where "I strongly agree" receives the value 1, and "I strongly disagree" - 5. Obtaining the lowest sum of points (1) means poor adaptation to the disease, while full agreement (5) expresses acceptance of the disease. The sum of points from 8 to 40 is a general measure of the degree of acceptance of the disease (Juczyński, 2001).

The obtained research results were analysed and then presented in descriptive, tabular and graphical form in figures. The statistical package Statistica v.13.3 (TIBCO Software Inc., Palo Alto, CA, USA) was used to process the material.

The significance of differences in the average values (medians) of quantitative variables with a non-normal distribution or with non-uniform variances in two independent groups was verified using the Mann-Whitney U test. In the case of a larger number of groups, the Kruskal-Wallis test was used, and Dunn's test was used as a post-hoc test. Qualitative variables were presented in tables as numbers (n) and proportions (%). Pearson's Chi-square test of independence was used to assess the relationships between two qualitative variables. Spearman's rank correlation coefficient rho was used to assess the strength and direction of correlations between two quantitative variables. All hypotheses were verified at a significance level of $p = 0.05$.

Results

The study group included 100 people (55 women and 45 men) aged 20 to 90 (mean M = 69 years, standard deviation SD = 12 years) who underwent cataract surgery. Basic characteristics of the study group of patients are presented in Table 1.

Table 1.
General characteristics of the operated patients (N=100)

Feature (variable)	Total *N* = 100		Women *N* = 55		Men *N* = 45		Result test
Age (years):							
M ± *SD*	68,6 ± 12,2		67,0 ± 13,3		70,4 ± 10,5		*Z* = -1,403
Me [*Q*1; *Q*3]	71 [64; 76]		71 [62; 74]		72 [64; 77]		*p* = 0,161
Min – Max	20 - 90		20 - 90		42 - 90		
Education:							
Primary, *n* (%)	5	5,0%	1	1,8%	4	8,9%	χ^2 = 36,2
Vocational, n (%)	25	25,0%	3	5,5%	22	48,9%	df = 3
Secondary, n (%)	44	44,0%	37	67,2%	7	15,5%	***p* < 0,001**
Higher, *n* (%)	26	26,0%	14	25,5%	12	26,7%	
Place of living:							χ^2 = 20,5
City, *n* (%)	65	65,0%	47	85,5%	18	40,0%	df = 1
Village, *n* (%)	35	35,0%	8	14,5%	27	60,0%	***p* < 0,001**
Marital status:							
Married, *n* (%)	65	65,0%	37	67,3%	28	62,2%	χ^2 = 3,08
Single, *n* (%)	5	5,0%	4	7,3%	1	2,2%	df = 3
Widow/widower, *n* (%)	26	26,0%	13	23,6%	13	28,9%	*p* = 0,380
Informal relation, *n* (%)	4	4,0%	1	1,8%	3	6,7%	
Professional activity:							
Student, *n* (%)	1	1,0%	1	1,8%	0	0,0%	χ^2 = 4,86
Works, *n* (%)	28	28,0%	17	30,9%	11	24,4%	df = 3
Does not work, *n* (%)	3	3,0%	0	0,0%	3	6,7%	*p* = 0,182
Retired, *n* (%)	68	68,0%	37	67,3%	31	68,9%	
Accomodation status:							χ^2 = 2,05
With family, *n* (%)	63	63,0%	33	60,0%	30	66,7%	df = 2
Alone, *n* (%)	17	17,0%	12	21,8%	5	11,1%	*p* = 0,360
With partner, *n* (%)	20	20,0%	10	18,2%	10	22,2%	

M – mean; *SD* – standard deviation; *Me* – median (50%); *Q*1 – lower quartile (25%); *Q*3 – upper quartile (75%); *Min* – minimal value; *Max* – maximal value; *n* – number; % - percentage; *p* – significance level of the statistical test; *Z* – significance test statistic; $\chi 2$ – chi-square test statistic; *df* – number of degrees of freedom; significant differences at the level of $p < 0.05$ are marked in **bold**

Source: own research

In the analysed group, there was a statistically significant relationship between gender and education. Similarly to the entire society, women were better educated. Compared to men, women were less likely to have basic vocational education (5.5% vs. 48.9%; $p < 0.001$) and more likely to have secondary education (67.2% vs. 15.5%; $p < 0.001$). Women lived in the city more often than men (85.5% vs. 40.0%; $p < 0.001$). However, no statistically significant relationship was observed between gender and age, marital status, professional activity and residential status.

The number and percentage of responses to the author's survey questions and the results of chi-square tests of independence are presented in Table 2.

Statistically significant differences between women and men, except for the obvious difference regarding shaving and applying make-up, concerned only staying out after dark (women less often: 32.7% vs. 57.8%; p = 0.015), cataracts in the family (women more often: 27.3% vs. 13.3%; p < 0.001) and type of glasses (women more often progressive: 22.7% vs. 3.1%; p = 0.005). The responses to the remaining survey questions did not differentiate women and men (p > 0.05).

Table 2.
Responses to the author's survey questions in the group of women and men undergoing cataract surgery and comparison results (N=100)

Survey question	Total N = 100		Women N = 55		Men N = 45		Test result
1. How do you assess your health?:							
Perfect (5 pts.)	2	2,0%	1	1,8%	1	2,2%	
Very good (4 pts.)	11	11,0%	7	12,7%	4	8,9%	$\chi^2 = 2{,}36$ df = 4 $p = 0{,}670$
Good (3 pts.)	44	44,0%	27	49,1%	17	37,8%	
Sufficient (2 pts.)	37	37,0%	17	30,9%	20	44,4%	
Poor (1 pts.)	6	6,0%	3	5,5%	3	6,7%	
2. How would you rate the condition of your eyesight ?:							
Good (5 pts.)	55	55,0%	31	56,4%	24	53,3%	$\chi^2 = 0{,}11$ df = 2 $p = 0{,}944$
Sufficient (4 pts.)	36	36,0%	19	34,5%	17	37,8%	
Poor (3 pts.)	9	9,0%	5	9,1%	4	8,9%	
3 Do you experience any discomfort such as burning eyes, pain, etc.?							
Yes	34	34,0%	23	41,8%	11	24,4%	$\chi2 = 4{,}42$ df = 2 p = 0,110
No	65	65,0%	31	56,4%	34	75,6%	
I don't know	1	1,0%	1	1,8%	0	0,0%	
4. If the previous answer was YES, please indicate how severe these symptoms are:							
Weak (1 pts.)	12	35,3%	8	34,8%	4	36,4%	$\chi2 = 0{,}02$ df = 2 p = 0,994
Moderate (2 pts.)	19	55,9%	13	56,5%	6	54,5%	
Strong (3 pts.)	3	8,8%	2	8,7%	1	9,1%	
5. Can you indicate which activities impose the greatest difficulties in everyday life?*:							
a. Watching TV	8	8,0%	2	3,6%	6	13,3%	$p = 0{,}135$
b. Reading books and newspapers	68	68,0%	38	69,1%	30	66,7%	$p = 0{,}832$
c. Shaving	10	10,0%	1	1,8%	9	20,0%	$\mathbf{p = 0{,}005}$
d. Applying make-up	9	9,0%	8	14,5%	1	2,2%	$\mathbf{p = 0{,}039}$
e. Searching for objects	26	26,0%	11	20,0%	15	33,3%	$p = 0{,}170$
f. Writing and reading books	42	42,0%	23	41,8%	19	42,2%	$p = 1{,}000$
g. Eye contact with interlocutor	3	3,0%	2	3,6%	1	2,2%	$p = 1{,}000$
h. Walking down stairs	9	9,0%	7	12,7%	2	4,4%	$p = 0{,}180$
i. Reading advertisements and street signs	15	15,0%	6	10,9%	9	20,0%	$p = 0{,}264$
j. No difficulty	23	23,0%	12	21,8%	11	24,4%	$p = 0{,}814$
6. Do vision problems make it difficult for you to achieve your intended goal?:							
Yes	25	25,0%	15	27,3%	10	22,2%	$\chi2 = 0{,}70$ df = 2 p = 0,704
No	56	56,0%	31	56,3%	25	55,6%	
I don't know	19	19,0%	9	16,4%	10	22,2%	

7. If the answer to the previous question is YES, please indicate how often these limitations occur:?:							
Every day	12	48,0%	8	53,4%	4	40,0%	$\chi2 = 5,16$ df = 4 p = 0,271
Once a week	3	12,0%	2	13,3%	1	10,0%	
Three times a week	7	28,0%	2	13,3%	5	50,0%	
Once a month	2	8,0%	2	13,3%	0	0,0%	
Less frequently	1	4,0%	1	6,7%	0	0,0%	
8. What are the consequences of your vision problems?*:							
Spending more time at home	30	30,0%	16	29,1%	14	31,1%	$p = 0,830$
Not leaving the house at night	44	44,0%	18	32,7%	26	57,8%	$\mathbf{p = 0,015}$
Needing family support in daily activities	4	4,0%	2	3,6%	2	4,4%	$p = 1,000$
Getting irritated often	35	35,0%	18	32,7%	17	37,8%	$p = 0,675$
Not socialising	10	10,0%	6	10,9%	4	8,9%	$p = 1,000$
None	29	29,0%	16	29,1%	13	28,9%	$p = 1,000$
9. Was there any discomfort after the procedure?							
None (1 pts.)	10	10,0%	6	10,9%	4	8,9%	$\chi2 = 1,01$ df = 3 p = 0,799
Small (2 pts.)	42	42,0%	22	40,0%	20	44,5%	
Mediocre (3 pts.)	31	31,0%	16	29,1%	15	33,3%	
Severe (4 pts.)	17	17,0%	11	20,0%	6	13,3%	
10. Did you experience any specific symptoms after the procedure?							
a. Pain, burning, itching	57	57,0%	30	54,5%	27	60,0%	$p = 0,686$
b. Dryness, tearing, tingling	49	49,0%	26	47,3%	23	51,1%	$p = 0,841$
c. Other symptoms	1	1,0%	1	1,8%	0	0,0%	$p = 1,000$
d. None	14	14,0%	8	14,5%	6	13,3%	$p = 1,000$
11. Did you notice any improvement in your vision after the procedure?							
None (1 pts.)	1	1,0%	1	1,8%	0	0,0%	$\chi2 = 3,06$ df = 3 p = 0,384
Low (2 pts.)	8	8,0%	3	5,4%	5	11,1%	
Moderate (3 pts.)	40	40,0%	25	45,5%	15	33,3%	
Great (4 pts.)	51	51,0%	26	47,3%	25	55,6%	
12. Have you noticed an increase in physical activity after cataract surgery?:							
Yes	53	53,0%	31	56,4%	22	48,9%	$\chi2 = 0,60$ df = 2 p = 0,740
No	15	15,0%	8	14,5%	7	15,6%	
I don't know	32	32,0%	16	29,1%	16	35,5%	
13. When was your cataract diagnosed?:							
Within last year	35	35,0%	22	40,0%	13	28,8%	$\chi^2 = 2,09$ df = 2 $p = 0,352$
Within lat 5 years	36	36,0%	20	36,4%	16	35,6%	
More than 5 years ago	29	29,0%	13	23,6%	16	35,6%	
14. Do you have diabetes?							$\chi^2 = 3,45$ df = 1 $p = 0,063$
Yes	67	67,0%	32	58,2%	35	77,8%	
No	33	33,0%	23	41,8%	10	22,2%	
15. Do you suffer from hypertension?							$\chi^2 = 0,01$ df = 1 $p = 0,920$
Yes	45	45,0%	25	45,5%	20	44,4%	
No	55	55,0%	30	54,5%	25	55,6%	
16. Has anyone in your family been diagnosed with cataract?							
Yes	41	41,0%	30	54,5%	11	24,4%	$\chi2 = 20,4$ df = 2 p < 0,001
No	21	21,0%	15	27,3%	6	13,3%	
I don't know	38	38,0%	10	18,2%	28	62,3%	

17. Did you have tests for glaucoma?							
Yes	44	44,0%	28	50,9%	16	35,6%	$\chi^2 = 2{,}38$ df = 2 $p = 0{,}304$
No	48	48,0%	23	41,8%	25	55,6%	
I don't know	8	8,0%	4	7,3%	4	8,8%	
18. Have you been diagnosed with glaucoma?							
Yes	20	20,0%	12	21,8%	8	17,8%	$\chi2 = 1{,}13$ df = 2 p = 0,569
No	79	79,0%	42	76,4%	37	82,2%	
I don't know	1	1,0%	1	1,8%	0	0,0%	
19. Do you have a driving license?							
Yes	30	30,0%	17	30,9%	13	28,8%	$\chi^2 = 0{,}49$ df = 2 $p = 0{,}784$
No	38	38,0%	22	40,0%	16	35,6%	
Yes, but I don't use it	32	32,0%	16	29,1%	16	35,6%	
20. Do you drive a car by yourself?							$\chi^2 = 0{,}12$ df = 1 $p = 0{,}728$
Yes	25	25,0%	13	23,6%	12	26,7%	
No	75	75,0%	42	76,4%	33	73,3%	
21. Do you wear glasses?							$\chi^2 = 0{,}30$ df = 1 $p = 0{,}583$
Yes	77	77,0%	44	80,0%	33	73,3%	
No	23	23,0%	11	20,0%	12	26,7%	
22. What type of glasses do you use?							
Myotropic	49	64,5%	26	59,1%	23	71,9%	$\chi^2 = 6{,}83$ df = 2 **$p = 0{,}033$**
Hypermetropic	16	21,1%	8	18,2%	8	25,0%	
Progressive	11	14,5%	10	22,7%	1	3,1%	
23. Do you use eye drugs?:							$\chi^2 = 0{,}86$ df = 1 $p = 0{,}353$
Yes	33	33,3%	21	38,2%	12	27,3%	
No	66	66,7%	34	61,8%	32	72,7%	
24. Do you take your medications regularly?:							$\chi2 = 0{,}12$ df = 1 p = 0,730
Yes	31	93,9%	20	95,2%	11	91,7%	
No	2	6,1%	1	4,8%	1	8,3%	
25. Do you have your eyesight checked at an ophthalmological clinic?							$\chi2 = 0{,}33$ df = 1 p = 0,566
Yes	98	98,0%	54	98,2%	44	97,8%	
No	2	2,0%	1	1,8%	1	2,2%	
26. How often do you have your eyesight checked?:							
Once a month	14	14,0%	10	18,2%	4	8,9%	$\chi2 = 6{,}99$ df = 3 p = 0,076
Three times a year	34	34,0%	22	40,0%	12	26,7%	
Once a year	41	41,0%	20	36,4%	21	46,6%	
Less frequently	11	11,0%	3	5,4%	8	17,8%	

*multiple choice question, percentages do not sum to 100; $\chi2$ – Pearson chi-square test statistic; df – degrees of freedom; p – test significance level

Source: own research

Before using psychometric tools, the reliability of the WHOQOL-BREF and AIS scale was assessed by calculating the value of the Cronbach's alpha index. Cronbach's alpha is a measure of the consistency of the items included in the factor being studied. Cocerning the WHOQOL-BREF scale, the index was 0.960, and the average correlation of items with the scale result was r = 0.492. The item reliability index proved to be satisfactory. All items strongly correlated with the final assess-

ment, as evidenced by the r correlation coefficient values ranging from 0.735 to 0.887. Also for the AIS scale, the Cronbach's alpha value was estimated, (0.951, and the average correlation of items with the scale score was r = 0.717).

All patients completed the WHOQOL-BREF questionnaire consisting of 26 questions in four domains: physical, psychological, social and environmental. The scoring of the questionnaire questions ranges from 1 to 5 and has a positive direction, i.e. the better the quality of life, the higher the number of points. In order to compare the quality of life in the examined life domains, the "raw" results were transformed to a scale of 0 to 100 points (Tab. 3).

Table 3.
Patients' quality of life assessed using the WHOQOL-BREF questionnaire (N=100)

Domains of quality of life on the WHOQOL-BREF scale (raw data transformed to a scale of: 0 - 100)	Statistics
D1: Physical domain:	
M ± *SD*	54,9 ± 18,3
Me [*Q*1; *Q*3]	54 [43; 70]
Min - Max	11 - 100
D2: Psychological domain:	
M ± *SD*	67,8 ± 15,2
Me [*Q*1; *Q*3]	71 [58; 77]
Min – Max	13 - 100
D3: Social domain:	
M ± *SD*	61,0 ± 18,2
Me [*Q*1; *Q*3]	67 [54; 75]
Min - Max	0 - 100
D4: Environmental domain:	
M ± *SD*	68,4 ± 15,4
Me [*Q*1; *Q*3]	70 [61; 80]
Min – Max	14 - 100
Overall score:	
M ± *SD*	63,0 ± 15,3
Me [*Q*1; *Q*3]	64 [55; 75]
Min - Max	10 - 97

Source: own research

The overall quality of life was 63.0 ± 15.3 (median 64 points), which is above the mean value for the WHOQOL-BREF scale, for which 0 points correspond to the worst and 100 points to the best quality of life. The average quality of life in the environmental domain was the highest and amounted to 68.4 ± 15.4 with a median of 70 points. Next, patients indicated the psychological domain with an average value of 67.8 ± 15.2 and a median of 71 points, then the social domain with an average value of 61.0 ± 18.2 and a median of 67 points. The physical domain was assessed the lowest, and the

average quality of life was at a level of 54.9 ± 18.3 and a median of 54 points (Tab 3).

No relationship was observed between patients' quality of life and gender. In all domains, the differences between the average assessments on the WHOQOL-BREF scale were insignificant (p > 0.05). However, a statistically significant negative correlation was observed between age and quality of life assessments in all domains of the WHOQOL-BREF scale: in the physical domain (rho = -0.482, p < 0,000), psychological (rho = -0.422, p < 0,001), social relations (rho = -0.349, p < 0,001) and environment (rho = -0.485, p < 0,001) (Spearman rank correlation coeffcient).

Patients with higher education assessed their quality of life significantly better in all domains (p <0,001) as well as city vs. village residents (p ≤ 0,007) (Tab. 4).

Table 4.
Quality of life and place of residence (N=100)

Domains of quality of life on the WHOQOL-BREF scale	City *N* = 65	Villege *N* = 35	Result test
D1: Physical domain:			
M ± *SD*	59,9 ± 18,6	45,7 ± 13,7	*Z* = 3,949
Me [*Q*1; *Q*3]	61 [47; 75]	43 [36; 54]	***p* < 0,001**
Min – Max	11 - 100	22 - 82	
D2: Psychological domain:			
M ± *SD*	71,6 ± 15,2	60,9 ± 12,8	*Z* = 3,877
Me [*Q*1; *Q*3]	75 [67; 83]	63 [50; 71]	***p* < 0,001**
Min – Max	13 - 100	29 - 83	
D3: Social domain:			
M ± *SD*	65,9 ± 16,9	51,9 ± 17,1	*Z* = 4,173
Me [*Q*1; *Q*3]	67 [58; 75]	58 [42; 67]	***p* < 0,001**
Min – Max	0 - 100	0 - 75	
D4: Environmental domain:			
M ± *SD*	71,0 ± 16,2	63,7 ± 12,6	*Z* = 2,692
Me [*Q*1; *Q*3]	74 [61; 83]	67 [55; 70]	***p* = 0,007**
Min - Max	14 - 100	33 - 83	

Source: own research

Quality of life also differed in groups of patients with various marital status. Persons living in a marriage and partnership were combined into the "in a relationship" group, while single persons and widows/widowers were combined into the "single" group.Patients living in a married or civil partnership assessed their quality of life significantly worse in all domains than those living alone (p < 0.05) (Tab. 5).

Table 5.
Quality of life and marital status (N=100)

Domains of quality of life on the WHOQOL-BREF scale	In relation *N* = 69	Single *N* = 31	Result test
D1: Physical domain:			
M ± *SD*	49,1 ± 15,9	67,8 ± 16,9	*Z* = -4,666
Me [*Q1; Q3*]	47 [39; 61]	75 [57; 79]	***p* < 0,001**
Min – Max	11 - 100	29 - 89	
D2: Psychological domain:			
M ± *SD*	64,7 ± 14,7	74,9 ± 14,2	*Z* = -3,782
Me [*Q1; Q3*]	67 [54; 75]	79 [71; 83]	***p* < 0,001**
Min – Max	13 - 100	38 - 92	
D3: Social domain:			
M ± *SD*	59,0 ± 17,3	65,6 ± 19,4	*Z* = -2,173
Me [*Q1; Q3*]	58 [50; 75]	75 [58; 75]	***p* = 0,030**
Min – Max	0 - 100	0 - 100	
D4: Environmental domain:			
M ± *SD*	64,4 ± 13,8	77,2 ± 15,2	*Z* = -4,166
Me [*Q1; Q3*]	67 [55; 74]	80 [67; 86]	***p* < 0,001**
Min - Max	14 - 89	33 - 100	

Source: own research

The authors also assessed quality of life on the WHOQOL-BREF scale in groups of patients with different professional activity. Patients who underwent cataract surgery were classified into one of two groups: "active" (employed) or "inactive" (others). No significant differences were found. Quality of life scores in both groups are presented in Table 6.

Table 6.
Quality of life scores of patients with different professional activity (N=100)

Domains of quality of life on the WHOQOL-BREF scale	Active *N* = 45	Non-active *N* = 55	Result test
D1: Physical domain:			
M ± *SD*	53,7 ± 17,8	55,8 ± 18,8	*Z* = -0,821
Me [*Q1; Q3*]	50 [43; 61]	57 [39; 71]	*p* = 0,412
Min – Max	22 - 100	11 - 89	
D2: Psychological domain:			
M ± *SD*	66,5 ± 13,9	68,9 ± 16,3	*Z* = -1,420
Me [*Q1; Q3*]	71 [54; 75]	75 [58; 79]	*p* = 0,156
Min – Max	38 - 100	13 - 92	
D3: Social domain:			
M ± *SD*	59,5 ± 16,2	62,3 ± 19,7	*Z* = -1,739
Me [*Q1; Q3*]	58 [50; 67]	67 [58; 75]	*p* = 0,082
Min – Max	25 - 100	0 - 100	

D4: Environmental domain:			
M ± *SD*	68,5 ± 13,7	68,3 ± 16,8	*Z* = -0,461
Me [*Q*1; *Q*3]	67 [58; 77]	70 [61; 80]	*p* = 0,645
Min - Max	42 - 99	14 - 100	

Source: own research

Finally, quality of life was assessed in groups of patients with different household size. The patients were classified into one of two groups: "single-person household" (living alone) or "multi-person" (living with family or life partner).

People living alone, compared to those living with family or a life partner, assessed their quality of life worse in the social domain (62.8 points vs. 52.5 points; p = 0.039) and in the environmental domain (69.6 points vs. 62.5 points; p = 0.049). The quality of life assessments in both groups are presented in Table 7.

Table 7.
Quality of life assessments in patients differing in household size (N=100)

Domains of quality of life on the WHOQOL-BREF scale	Household		Result test
	Multi-person *N* = 83	Single-person *N* = 17	
D1: Physical domain:			
M ± *SD*	56,4 ± 18,0	47,3 ± 18,5	*Z* = 1,785
Me [*Q*1; *Q*3]	54 [43; 75]	43 [32; 64]	*p* = 0,074
Min – Max	11 - 100	22 - 71	
D2: Psychological domain:			
M ± *SD*	68,7 ± 15,0	63,6 ± 16,3	*Z* = 1,340
Me [*Q*1; *Q*3]	71 [58; 79]	63 [50; 75]	*p* = 0,180
Min – Max	13 - 100	38 - 88	
D3: Social domain:			
M ± *SD*	62,8 ± 16,9	52,5 ± 22,0	*Z* = 2,060
Me [*Q*1; *Q*3]	67 [58; 75]	50 [33; 67]	***p* = 0,039**
Min – Max	0 - 100	25 - 100	
D4: Environmental domain:			
M ± *SD*	69,6 ± 15,0	62,5 ± 16,3	*Z* = 1,973
Me [*Q*1; *Q*3]	70 [64; 80]	58 [55; 70]	***p* = 0,049**
Min - Max	14 - 99	42 - 100	

Source: own research

The results of disease acceptance obtained in the studied group of patients using the AIS (Acceptance of Illness Scale) questionnaire are shown in Table 8.

Table 8.
Assessment of disease acceptance in the studied group of patients (N=100)

Assessment of disease acceptance (AIS)	Descriptive statistics
Total score (AIS scale):	
M ± *SD*	27,8 ± 7,9
Me [*Q*1; *Q*3]	27 [22; 36]
Min – Max	8 – 40
Level of disease acceptance AIS:	
Low (8 – 18 pts.)	9 (9,0%)
Moderate (19 – 29 pts.)	54 (54,0%)
High (30 – 40 pts.)	37 (37,0%)

Source: own research

Patients after cataract removal surgery presented an average level of disease acceptance. Most patients (54%) accept the disease at a moderate level, and 37% of patients accepted it at a good level.

The relationship between disease acceptance (in the AIS scale) and quality of life domains (WHOQOL-BREF scale) was assessed by calculating the values of Spearman's rank correlation coefficients rho (Table 9). A strong, positive correlation was observed between AIS and all quality of life assessments.

Table 9.
Spearman's rank correlation coefficient values - level of disease acceptance AIS vs. quality of life assessments in the domains of the WHOQOL-BREF questionnaire (N=100)

	rho	*t*(*N*-2)	*p*
AIS vs. Physical domain	0,779	12,291	**<0,001**
AIS vs. Psychological domain	0,816	13,962	**<0,001**
AIS vs. Social domain	0,741	10,929	**<0,001**
AIS vs. Environmental domain	0,775	12,124	**<0,001**

Source: own research

Discussion

Cataract is the leading cause of blindness; and it affects moderately severe visual impairment worldwide. It is estimated that over 48% of the causes of vision loss are caused by this disease, which is why it is a major challenge for public health. Surgical treatment can restore vision, but not every country is developed enough for every patient to be able to afford such an operation. One of the countries where the level of cataract surgery is still low is India, where cataract is one of the main causes of blindness (Vs Murthy, Jain, Shamanna & Subramanyam, 2014).

Literature indicates sociodemographic and clinical factors that may affect the quality of life of a patient after cataract surgery, as well as the assessment of a healthy lifestyle and self-control by patients with eye diseases. Identification of these factors is crucial, especially in the case of outpatients who are just deciding to have cataract surgery.

The main goal of cataract surgery is to improve or maintain the quality of life of the patient's vision. The ophthalmologist, together with the patient, makes the decision to perform the surgery based on the degree of vision deterioration. The time of cataract removal is determined jointly by the doctor and the patient, who perform an analysis to determine whether the decrease in vision significantly interferes with the patient's daily activities. The decision to operate must be tailored to the individual needs of the patient. According to the authors, cataracts mainly affect people over 50 years of age. Similar conclusions were observed in their study by Akpolat et al., 2022.

The current research provides valuable insight into the quality of life of patients after cataract surgery. The mean overall quality of life of the patients, measured using the WHOQOL-BREF scale, was 63.0 ± 15.3 points, which is above the mean for this scale. Detailed analyses indicated that the patients rated the highest quality of life in the environmental domain and the lowest in the physical domain. Moreover, there is a significant correlation between the age of patients and their quality of life in various domains of the WHOQOL-BREF scale. The observed decline in quality of life with age was visible in all domains of the studied scale. It is worth noting that in the group of people over 50 years of age this decline was even greater. Cataract is particularly common in the elderly, which is confirmed by studies conducted by me and other authors, including those conducted at the Voivodeship Ophthalmological Hospital in Krakow at the Eye Trauma Department in 1995 and 2005. This report suggests that there was a more than six-fold increase in the number of patients over 80 years of age who required hospitalisation due to the development of cataract (Strzałka, 2006). These results may have important clinical implications, suggesting the need for more intensive care and support for older patients after cataract surgery, especially in the context of physical aspects of quality of life.

According to our own survey, patients with comorbidities such as diabetes, hypertension and/or glaucoma reported little or no improvement in their quality of life after cataract surgery. However, there was no significant association between gender and patients' quality of life assessments after cataract surgery. This indicates that gender does not have a significant impact on the perceived quality of life after the procedure. The patients' quality of life improved and their independence in performing daily activities also increased. Most of the respondents were satisfied with the effects of the therapy, assessing them as good or very good. The results obtained are very similar to the results of the study conducted in Sweden by Lundstrom et al., where a high level of satisfaction with vision was found among the majority of patients after cataract surgery (Lundstrom et al., 2002).

One of the most recent research studies by Błachnio et al. assessing quality of life after cataract surgery show quite the similar results concerning the overall patients' quality of life (67% of patients rated their health as very good) and its correlation with AIS scale results (median AIS score 34 – high level of disease acceptance). The highest QoL score was in the environmental domain, as in our study, hovever, differences were observed in other domains. In our study the lowest scored domain was the physical, while in the research of Błachnio et al. – the social one (Błachnio et al., 2024). It might be due to the mean older population in our study which is reflected by lower level of disease acceptance (27 vs. 34). Note that other observed parameters and corelations were similar, especially the negative impact of age on QoL. Moreover, we assessed correlations between some demographic factors (level of education, place of residence, and mode of living) and quality of life which the mentioned work of Błachnio et al. did not happen to detect (Błachnio et al., 2024).

In summary, the results of these studies emphasise the importance of assessing the quality of life of patients after cataract surgery, with particular attention to age-related factors. Implementing appropriate care and support strategies can help improve the quality of life of these patients, especially in the case of older people, whose functioning may be more limited due to age.

Conclusions

The average quality of life of patients assessed with the WHOQOL-BREF questionnaire was above average in all domains. The best rated quality of life was in the environmental domain, the worst - in the physical domain.

Quality of life did not depend on gender, but strongly correlated negatively with age. It was also significantly higher in people with higher education, city dwellers, singles and those living with family or life partner.

Patients after cataract surgery presented a moderate level of disease acceptance. A strong, positive correlation was observed between AIS and all quality of life scores.

References

Akpolat, C., Demir, M., Cevher, S., Ozturk, S. Z., & Yesiltas, S. (2022). The impact of phacoemulsification surgery on vision-related quality of life in senile cataract patients. Therapeutic Advances in Ophthalmology, 14, 25158414211063293. https://doi.org/10.1177/25158414211063293

Benjamin, L. (2007). Chirurgia zaćmy [Cataract surgery]. Wrocław: Urban & Partner.

Błachnio, K., Dusińska, A., Szymonik, J., et al. (2024). Quality of life after cataract surgery. Journal of Clinical Medicine, 13(17), 5209. https://doi.org/10.3390/jcm13175209

Cicinelli, M. V., Buchan, J. C., Nicholson, M., Varadaraj, V., & Khanna, R. C. (2023). Cataracts. The Lancet, 401(10374), 377–389. https://doi.org/10.1016/S0140-6736(22)02062-4

Delbarre, M., & Froussart-Maille, F. (2020). Sémiologie et formes cliniques de la cataracte chez l'adulte [Signs, symptoms, and clinical forms of cataract in adults]. Journal Français d'Ophtalmologie, 43(7), 653–659. https://doi.org/10.1016/j.jfo.2020.05.001

Juczyński, Z. (2001). Narzędzia pomiaru w promocji zdrowia [Measurement tools in health promotion] (pp. 171–174). Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.

Kański, J. J. (1997). Okulistyka kliniczna [Clinical ophthalmology] (pp. 286–294). Wrocław: Urban & Partner – Wydawnictwo Medyczne.

Lundström, M., Brege, K. G., Florén, I., Lundh, B., Stenevi, U., & Thorburn, W. (2002). Cataract surgery and quality of life in patients with age-related macular degeneration. British Journal of Ophthalmology, 86, 1330–1333. https://doi.org/10.1136/bjo.86.12.1330

Partyka, O., & Wysocki, M. J. (2015). Epidemiologia chorób narządu wzroku oraz infrastruktura okulistyki w Polsce [Epidemiology of eye diseases and ophthalmic care infrastructure in Poland]. Przegląd Epidemiologiczny, 69, 905–908.

Pesudovs, K., Lansingh, V. C., Kempen, J. H., et al. (2021). Cataract-related blindness and vision impairment in 2020 and trends over time in relation to VISION 2020: The Right to Sight: An analysis for the Global Burden of Disease Study. Investigative Ophthalmology & Visual Science, 62, 3523. https://doi.org/10.1167/iovs.62.8.3523

Strzałka, A. (2006). Choroby okulistyczne wymagające hospitalizacji u pacjentów w podeszłym wieku [Ophthalmic diseases requiring hospitalization in elderly patients]. Gerontologia Polska, 14(3), 125–129.

Szymor, J., Frątczak, S., & Jurowski, P. (2015). Istotne problemy współczesnej fakoemulsyfikacji [Key issues in modern phacoemulsification]. Okulistyka po Dyplomie, 4, 77–91.

Murthy, G. V. S., Jain, B. K., Shamanna, B. R., & Subramanyam, D. (2014). Improving cataract services in the Indian context. Community Eye Health Journal, 27(85), 4–5.

Wołowicka, L., & Jaracz, K. (2001). Jakość życia w naukach medycznych [Quality of life in medical sciences] (pp. 231–238). Poznań: Wydawnictwo Uczelniane Akademii Medycznej w Poznaniu.