

ASSESSMENT OF THE QUALITY OF LIFE OF PATIENTS AFTER CATARACT SURGERY, WITH THE USE OF DIFFERENT TYPES OF INTRAOCULAR LENSES

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Abstract: Goal: To evaluate the quality of life of patients after cataract surgery, with the use of different types of intraocular lenses. **Methods:** This is a quantitative, cross-sectional and observational study, carried out in 2020, with 50 patients operated on for cataracts, at Instituto de Olhos Cristiano Mendonça (IOCM), in Aracaju, Sergipe. The following criteria were applied for selection: patients over 18 years of age, submitted to cataract surgery in one or both eyes, literate, without cognitive deficits, and who agreed to participate in the research by signing the Free and Informed Consent Form (ICF). In the period between August and October 2020, data collection was carried out, using the *Visual Function Index questionnaire* (VF-14) adapted to Portuguese as a collection instrument. **Results:** 25 patients used multifocal lens implants, and 25 used single vision lens implants, with a mean age of 65.4 years (± 6.6 SD). 23 patients were male (46%) and 27 were female (54%). No statistically significant difference was found between lens types in any of the VF-14 questions, considering the level of significance ($\alpha = 0.05$). In the group of monofocal lenses, there was a greater variability of the scores than that of the multifocal lenses. The sociodemographic characteristics evaluated in faceted patients – age, sex and marital status – are in accordance with the literature. **Conclusion:** Although the comparison between monofocal and multifocal lenses through the VF-14 scores did not show significant differences between the two types of lenses, it is possible to conclude that the quality of visual life improved after cataract surgery.

Keywords: Quality of life; Cataract; intraocular lenses; visual acuity; Patient health questionnaire.

INTRODUCTION

The lens is a translucent tissue, as it is composed of cells arranged longitudinally that lose organelles when they are being formed, a factor that favors its transparency, which is a fundamental characteristic for the light to be focused on the back of the eye.

However, for various reasons, the lens becomes opaque due to the denaturation of its proteins, which generates the disease called cataract. Such opacification causes a turbidity that generates clinical manifestations such as decreased visual acuity, which can lead to total blindness.

What determines the degree of this loss of visual acuity is the density and location of the cataract. If it is located on the periphery of the lens, there may be no visual change or it may be minimal, however, if the cataract forms in the area of the lens behind the pupil, vision may be severely impaired (RIAZ et al., 2013).

The World Health Organization (WHO) estimated from a global review of research that 37 million people worldwide were blind in 2002 (Passlini 2004 ; Resnikoff 2004) and that age-related cataracts remained the leading cause of blindness globally that year, as it was in 1990.

Also according to the WHO, it is estimated that at least 2.2 billion people in the world have visual problems or blindness (WHO, 2019), with cataract responsible for almost 18 million cases of blindness, consolidating globally as its biggest cause. (PETRASH, 2013; ALMANÇA et al., 2018).

The treatment of senile cataract is currently surgical. This surgery, thanks to the biomedical advances of ophthalmic microsurgery, has earned its place as a mainstay in cataract treatment. It is important to point out that there is currently no medical treatment that has been proven to delay cataract enlargement or reduce its size or prevent its appearance (GOMES

et al., 2018). The most used method today is Phacoemulsification, which involves the ultrasonic fragmentation of the lens. Subsequently, the IOL (Intraocular Lens) is placed in the location of the lens. According to the number of focal points, IOLs are classified as monofocal or multifocal.

The objective of this study is to evaluate the individual perception of the change in quality of life after cataract surgery, since it has been noticed that in some patients, even with lower-than-expected visual acuity, they report satisfaction with their vision after the surgical procedure, buying with different types. intraocular lenses (monofocal or multifocal).

METHODS

The study carried out in 2020 at Instituto de Olhos Cristiano Mendonça (IOCM), in Aracaju, Sergipe, had the participation of 50 patients operated on for cataract. This was a quantitative, cross-sectional and observational study.

The sample consisted of numbers equivalent to patients with each type of intraocular lens, making the comparison closer to reality, of a non-probabilistic convenience type, and proportional to the attendance of patients operated on by a single ophthalmologist at the IOCM in the current context, and the time available for data collection.

The following inclusion criteria were used for selection: patients over 18 years of age, submitted to cataract surgery in one or both eyes, literate, without cognitive deficits, and who agreed to participate in the research by signing the Free and Clarified (FICT). Patients with pre, intra or postoperative complications, and those with other eye diseases that could compromise visual acuity, such as glaucoma and macular pathologies, were excluded from the sample.

The period between August and October 2020 was used for data collection after the approval of the research project by the Research Ethics Committee of Universidade Tiradentes on July 20, 2020, under CAAE 29901320.1.000.5371. Through the IOCM database, information was collected from 119 patients operated on in the last 2 years and who met the study criteria.

The receptionists working at the IOCM contacted these patients via telephone in order to inform them about the study. After this first procedure, the researchers contacted the patients inviting them to participate in the study in a virtual way. Through this remote means, all the objectives and necessary information were explained and total freedom to participate or not in the study was guaranteed.

Of the 119 patients surveyed from the institute's data, 104 were contacted and only 50 decided to accept the invitation and participate in the research, signing the informed consent according to Resolution No. 466 of December 12, 2012, of the National Health Council (CNS), made available via electronic mail. A form was filled out by the patients containing personal and sociodemographic data, namely: name, age, sex, marital status, education level and profession and later, by telephone, using the *Visual Function Index questionnaire* (VF-14) as a collection instrument.) adapted to Portuguese, the participants were interviewed. This questionnaire consists of 14 questions that assess the patient's difficulty or not in performing activities such as reading small print contained in medication leaflets and telephone directory; read newspaper or book; reading the title of a book or large print in the newspaper or the telephone numbers; recognize people across the street; see steps, stairs, or sidewalks; read traffic signs, street signs or bus destination; doing manual work

such as embroidering, sewing, cutting with scissors; fill in checks and forms; play games like bingo, checkers, dominoes, card game; participate in sports such as football, tennis, volleyball or bowling; Cook; watch television; driving during the day; and driving at night.

Each activity is quantified using the following scale: I cannot do it (0 points); very difficult (1 point); moderate difficulty (2 points); little difficulty (3 points); no difficulty (4 points). The final result for each question is obtained by multiplying the number of points by 25, and then obtaining a score that varies from 0 to 100. The higher the score, the better the visual performance for a given activity.

The overall score is calculated from the equation:

$$E = \frac{S}{n} \times 25$$

where E means the final score, the sum of the points of all the questions answered, and the number of questions answered by the interviewee. If the patient does not perform any activity in the questionnaire, the question related to this activity will not be part of the final score. The overall score ranges from 0 to 100.

After completing the data collection, they were tabulated in an electronic spreadsheet, using Microsoft Excel, and statistically analyzed by SPSS version 16.0 for Windows, and by R Studio version 3.4.2. Graphs were produced with the average scores of the monofocal and multifocal lens groups for each question of the VF-14, as well as graphs with the distribution of the general scores of the patients between the groups and their variability. In addition, tables containing absolute and relative frequency, mean and standard deviation of sociodemographic data were prepared.

As indicated, statistical tests were applied to the sample. Student's t test for

two independent samples was performed to verify if there is a significant difference between the two groups (patients operated on with monofocal and multifocal lenses) through their means. A table was created and it contained the mean scores of each group, the p-values, and the confidence interval for each question. In addition, the Chi-Square test of independence was also applied, whose objective was to verify if there is an association between the profession and the type of lens chosen.

RESULTS

Fifty facctomized patients were evaluated in this study, 25 of them with single vision lens implants and 25 with multifocal lens implants.

Of this total number of patients, 23 were male (46%) and 27 were female (54%). The overall mean age of patients was 65.4 years \pm 6.6 SD, being 63.9 years among patients with single vision lenses and 67 years among patients with multifocal lenses. Married individuals were predominant (70%), and with leveled education in higher education (46%) and high school (32%). The sociodemographic information of the interviewees is represented below in tables 2 and 3.

The single vision intraocular lens models used ranged from Acrysof SN60WF, Tecnis ZCB00, and Clareon Autonome. Regarding multifocal intraocular lenses, implants from Tecnis Symphony, Acrysof IQ Panoptix, and Acrysof IQ Restor were performed.

All patients evaluated in this study were operated on by the same ophthalmologist, submitted to the same surgical technique (phacoemulsification) and none of the patients developed any type of complication.

In assessing the quality of life after cataract surgery, patients were evaluated using the VF-14 questionnaire (Appendix 2) grading scores for each of the 14 questions of the instrument.

Variable	Monofocal Lenses				Multifocal Lenses			
	No	%	Average	PD	No	%	Average	PD
Age			63.92	±6.4			67	±6.6
Sex								
Male	14	56%			9	36%		
Feminine	11	44%			16	64%		
Marital status								
Married	18	72%			17	68%		
Single	1	4%			two	8%		
Widower	3	12%			3	12%		
Separate	1	4%			0	0%		
Divorced	2	8%			3	12%		
Education								
Elementary School	3	12%			two	8%		
High school	6	24%			10	40%		
Higher level	12	48%			11	44%		
Postgraduate studies	4	16%			two	8%		

Caption: n - absolute frequency. % - percentage relative frequency. DP - Standard Deviation.

Table 2. General information about patients operated on with monofocal (n=25) and multifocal (n=25) lenses.

Source: Prepared by the author.

Variable	No	%	Average	PD
Age			65.46	±6.6
Sex				
Male	23	46%		
Feminine	27	54%		
Marital status				
Married	35	70%		
Single	3	6%		
Widower	6	12%		
Separate	1	two%		
Divorced	5	10%		
Education				
Elementary School	5	10%		
High school	16	32%		
Higher level	23	46%		
Postgraduate studies	6	12%		

Caption: n - absolute frequency. % - percentage relative frequency. DP - Standard Deviation.

Table 3. General information about patients operated on with monofocal and multifocal lenses (n=50).

Source: Prepared by the author.

For question number 1, the mean VF-14 score of patients operated on with single vision lenses was 81, while for those operated on with multifocal lenses it was 76. To verify if there was any statistically significant difference between the mean scores of this question, Student's t test was performed, and with a p-value of 0.5652, it is concluded that no statistically significant difference was found, considering the level of significance ($\alpha = 0.05$) between the two groups in this question. The confidence interval for the mean of this question ranged from 70.1 to 86.9, reinforcing the test result, as the means obtained are within the range.

With reference to question number 2, the mean score of patients operated on with single vision lenses was 90.62; for those operated with multifocal lenses, it was 93.75. Student's t-test was applied, obtaining a p-value of 0.5952 and from it, it can be concluded that the groups were statistically similar for this question, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question, however, was from 70.2 to 86.9, values in which the means obtained are outside the range.

Regarding question number 3, the mean score of patients operated on with monofocal lenses was 97, while for those operated on with multifocal lenses it was 100. Student's t test was applied, with a p-value of 0.3273, it is concluded that the groups were statistically similar for this question, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question was from 95.6 to 101.4, reinforcing the test result, as the means obtained are within the range.

For question number 4, the mean score of patients operated on with monofocal lenses was 98.96, while for those operated on with multifocal lenses it was 91. Student's t test was applied, and with a p-value of 0, 0991, it is concluded that the groups were statistically

similar, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question ranged from 90.2 to 99.6, reinforcing the test result, as the means obtained are within the range.

For question number 5, the mean score of patients operated on with single vision lenses was 93; for those operated on with multifocal lenses, it was 99. The Student's t test was applied, and presenting a p-value of 0.1773, it is concluded that the groups were statistically similar, considering the level of significance ($\alpha = 0, 05$). The confidence interval for the mean of this question was from 91.7 to 100.3, reinforcing the test result, as the means obtained are within the range.

Regarding question number 6, the mean score of patients operated on with single vision lenses was 93; for those operated on with multifocal lenses, it was 99. The Student's t test was applied, and presenting a p-value of 0.1773, it is concluded that the groups were statistically similar, considering the level of significance ($\alpha = 0, 05$). The confidence interval for the mean of this question was from 91.7 to 100.3, reinforcing the test result, as the means obtained are within the range.

Regarding question number 7, the mean score of patients operated on with single vision lenses was 88.16; for those operated with multifocal lenses, it was 83.33. Using Student's t test, and with a p-value of 0.6295, it is concluded that no statistically significant difference was found, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question ranged from 78.4 to 93.7, reinforcing the test result, as the averages obtained are within the range.

Regarding question number 8, the mean score of patients operated on with single vision lenses was 98; for those operated on with multifocal lenses, it was 97. Using Student's t-test, and with a p-value of 0.6295, it is concluded that no statistically significant

difference was found, considering the level of significance ($\alpha = 0, 05$), between the two groups in this question. The confidence interval for the mean of this question ranged from 78.4 to 93.7, reinforcing the test result, as the means obtained are within the range.

For question number 9, the mean score of patients operated on for cataracts with both lenses reached the value of 100, concluding that there was no difference between the groups, as both lenses managed to obtain the maximum value of quality of life for this question.

Regarding question number 10, the mean score of patients operated on with monofocal lenses was 87.5, while for those operated on with multifocal lenses it was 100. Student's t-test was applied, with a p-value of 0.5. It is concluded that the groups were statistically similar, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question, however, was from 90.3 to 97.2, values in which the means obtained are outside the range. It is important to note that few patients reported performing the activity related to this issue.

For question number 11, the mean score of patients operated with monofocal lenses reached the value of 98.44; for those operated on with multifocal lenses, it reached the value of 100. The Student's t test was performed, and with a p-value of 0.3332, it is concluded that no statistically significant difference was found, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question was from 98.1 to 100.4, reinforcing the test result, as the means obtained are within the range.

For question number 12, the mean score of patients operated on with single vision lenses reached a value of 98; for those operated with multifocal lenses, it reached the value of 92.71. Student's t test was performed, and with a p-value of 0.2801, it is concluded that

no statistically significant difference was found, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question ranged from 90.8 to 100.1, reinforcing the test result, as the means obtained are within the range.

Regarding question number 13, the mean score of patients operated on with single vision lenses was 98.69; for those operated on with multifocal lenses, it was 100. The Student's t test was applied, and presenting a p-value of 0.3306, it is concluded that the groups were statistically similar, considering the level of significance ($\alpha = 0, 05$). The confidence interval for the mean of this question was from 98.1 to 100.5, reinforcing the test result, as the means obtained are within the range.

For the last question of the VF-14, in question number 14, the mean score of patients operated on with single vision lenses was 85.29; for those operated with multifocal lenses, it was 96.15. Student's t test was applied, and presenting a p-value of 0.1155, it is concluded that the groups were statistically similar for this question, considering the level of significance ($\alpha = 0.05$). The confidence interval for the mean of this question ranged from 84.4 to 96.6, reinforcing the test result, as the means obtained are within the range.

Table 4 and figure 1 contain all information about the p-values and confidence intervals, as well as the mean scores for each VF-14 question for each of the lens groups.

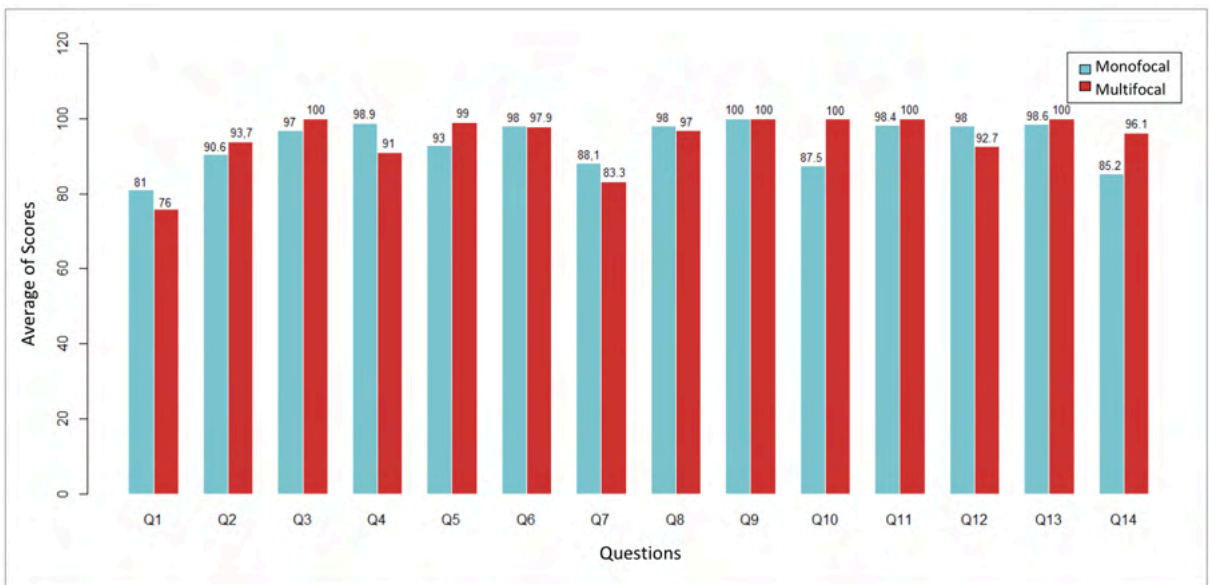
The boxplot plots in figure 2 also reinforce the results found (the bold line indicates the median and, as you can see, there is no significant difference between them in the two groups). In this graph, the shape of the "box" indicates the distribution of the data, and with it is also possible to verify that the variability of the scores of the group of monofocal lenses is greater than that of the multifocal lenses.

In relation to the individuals' profession, a division was made by area in which the

Question	Patients operated on with single vision lenses (n=25)	Patients operated on with multifocal lenses (n=25)	p value	Confidence Interval
	Average	Average		
1 - Small letters	81	76	0.5652	[70.1; 86.9]
2 - Medium letters	90.62	93.75	0.5952	[70.2; 86.9]
3 - Large letters	97	100	0.3273	[95.6; 101.4]
4 - Recognize people from a distance	98.96	91	0.0991	[90.2; 99.6]
5 - See steps and sidewalks	93	99	0.1773	[91.7; 100.3]
6 - Read traffic signs and bus signs	98	97.92	0.9669	[96.1; 99.8]
7 - Do manual work	88.16	83.33	0.6295	[78.4; 93.7]
8 - Fill in forms	98	97	0.6456	[95.4; 99.6]
9 - Play table games	100	100	-	-
10 - Practice sports in general	87.5	100	0.5	[90.3; 97.2]
11 - Cooking	98.44	100	0.3332	[98.1; 100.4]
12 - Watch TV	98	92.71	0.2801	[90.8; 100.1]
13 - Driving through the day	98.69	100	0.3306	[98.1; 100.5]
14 - Driving at night	85.29	96.15	0.1155	[84.4; 96.6]

Table 4. Scores of patients operated on with monofocal and multifocal lenses - VF-14 (Student's t test).

Source: Prepared by the author.



Caption: Q1 - Small print. Q2 - Medium letters. Q3 - Large print. Q4 - Recognize people from a distance. Q5 - See steps and sidewalks. Q6 - Read traffic signs and bus signs. Q7 - Do manual work. Q8 - Fill in forms. Q9 - Play table games. Q10 - Practicing sports in general. Q11 - Cooking. Q12 - Watch TV. Q13 - Driving by day. Q14 - Driving at night.

Figure 1. Average question scores (VF-14) from 1 to 14 per lens.

Source: Prepared by the author.

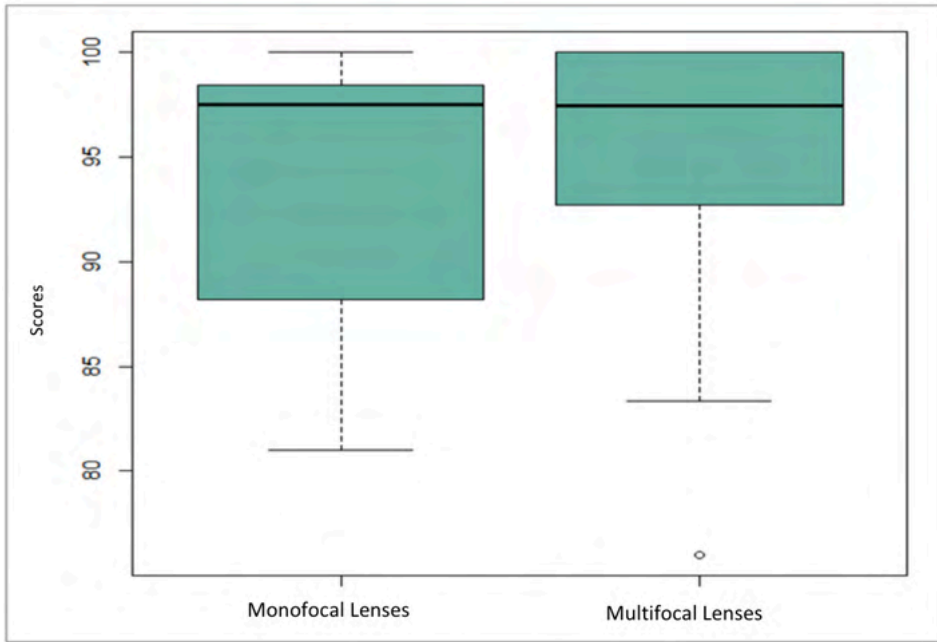


Figure 2. Boxplot of scores of patients operated on with monofocal and multifocal lenses.
Source: Prepared by the author.

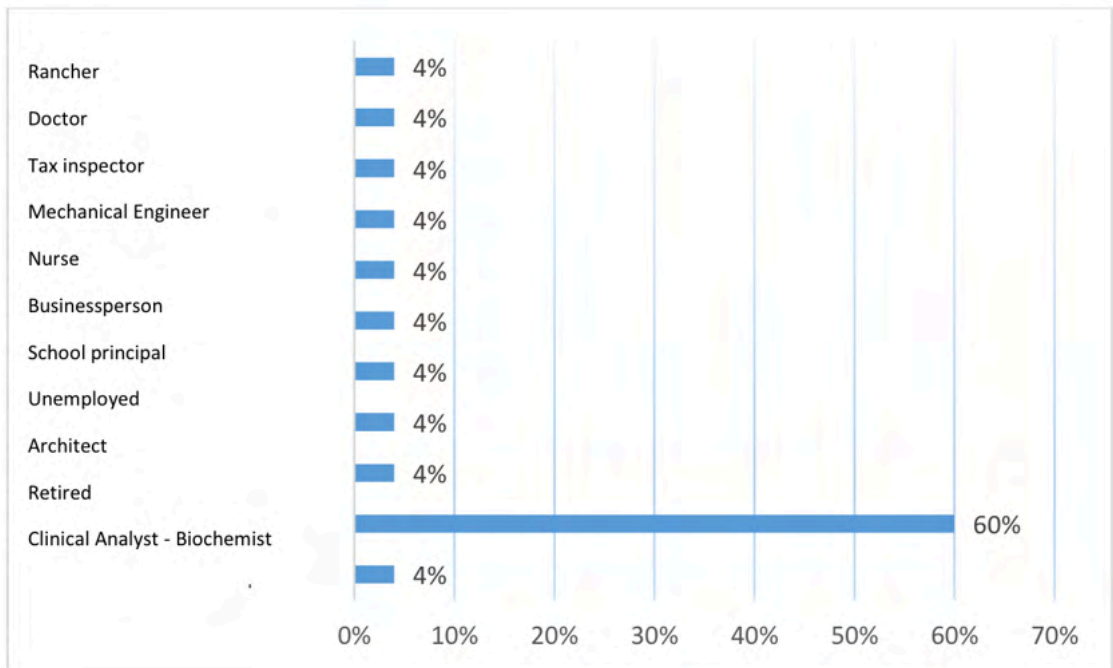


Figure 3. Graph of professions in patients operated on with single vision lenses.
Source: Prepared by the author.

patients work to apply the Chi-Square test of independence, whose objective is to verify if there is an association between the profession and the type of lens chosen. Most individuals are retired (68%). With a p-value of 0.3923 (>

$\alpha = 0.05$), there is no relationship between the profession and the choice of intraocular lens type. The results are represented in the graphs of figures 3 and 4, as well as in table 4.

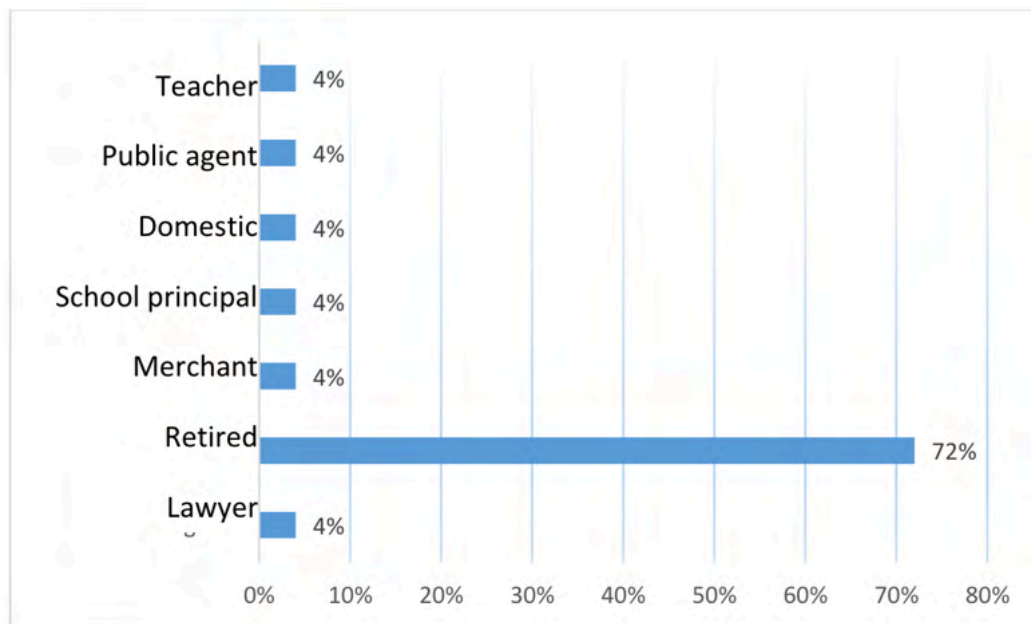


Figure 4. Graph of professions in patients operated on with multifocal lenses.

Source: Prepared by the author.

Area	Lens Type		p value
	monofocal	multifocal	
Education	1	two	
Health	3	0	
Engineering and Architecture	two	0	
Business	1	1	
Unemployed/Retired	16	18	0.3923
General Services	0	1	
Right	0	1	
Livestock	1	0	
public office	1	1	

Table 4. Chi-Square Test to assess the relationship between professional area and type of lens chosen.

Source: Prepared by the author.

DISCUSSION

According to the literature, cataracts are the leading cause of visual impairment and blindness in the world. The present study aimed to evaluate the quality of life of patients after cataract surgery according to the type of lens used. For this, the VF-14 questionnaire was applied to 50 patients operated on at the IOCM.

Some sociodemographic characteristics such as age, gender distribution and marital status obtained results compatible with those evidenced in the literature. The mean age found in the study was 65.4 years \pm 6.6SD, precisely the age group of the population most affected by cataract, which is confirmed both in the literature and in international studies.

According to Kara-José (KARA-JOSÉ et al., 2009), the prevalence of cataract in patients was estimated at 2.5% in people aged between 40 and 49 years, 6.8% between 50 and 59 years, 20% between 60 and 69 years old, 42.8% between 70 and 79 years old and 68.3% in people over 80 years old.

Regarding the distribution of genders and marital status, this study showed a predominance of female patients with 54% and married individuals with 70%. The same happened in a cross-sectional study of the article by Gomes (GOMES et al., 2008), with a review of 148 medical records of patients operated on for cataract, which was published in the *Revista Brasileira de Oftalmologia*. In this study there was also a predominance of females with 60.1% and in addition, 54.7% of the patients were married. This difference between men and women occurs due to a greater search for health services by women, and the fact that there is a greater number of elderly women globally than elderly men, which exposes the female public more to risk factors for the development of the Cataract (MENDONÇA et al., 2018).

The patients observed in this study, in general, presented results that indicate a high quality of life in the performance of all activities of daily living related to vision, suggested by the questions of VF-14, after cataract surgery, as seen in some questions of the questionnaire as question 4 (recognise people at a distance) with 98.96 points; question 6 (read traffic signs and bus signs) with 98 points; question 8 (fill in forms) also scored 98 points; question 9 (playing board games) with 100 points; question 11 (cooking) with 98.44 points; and question 13 (driving by day) with 98.69 points.

Other studies showed similar results that corroborated the improvement in quality of life after cataract surgery, as well as patient satisfaction according to the lens used. According to a published study, the level of satisfaction of patients undergoing implantation of bifocal and multifocal intraocular lenses was significantly higher than that observed in patients undergoing implantation of monofocal lenses (SANTOS et al., 2014).

In the present study, comparing the effectiveness between monofocal and multifocal lenses, the mean scores of all the VF-14 questions were relatively close, and did not present statistically significant differences between the two types of intraocular lenses, and it is not possible to conclude in this study that, in fact, one type of lens excels another in a given activity.

In the literature, it is described that multifocal lenses, under low light, can cause visual phenomena such as the halos and glares, and may present a lower level of contrast for colors compared to monofocal IOLs. Also, there is big difference between the cost of different types of lenses. Lenses, despite having the purpose of correcting the opacity of the lens, can also provide correction for some refractive pathologies (MENDONÇA et al., 2018).

Therefore, it is important to emphasize that the choice of the type of IOL lens must be evaluated through clinical criteria and the patient's choice, under the guidance of the ophthalmologist who has the role of discussing with the patient, through a good anamnesis, about multiple variables such as costs, concomitant diseases and the need to correct ametropias, for example.

CONCLUSION

The sociodemographic characteristics discussed in the study, such as age, sex and marital status, are all in agreement with the literature, with a predominance of individuals

between 60 and 70 years of age, female and married.

Regarding the quality of life of the patients studied, all cataract surgery patients had a high quality of life, according to the evaluation of the data.

On the other hand, the comparison between the lenses, using the VF-14 score, showed minimal differences in visual quality between single-focal and multifocal lenses, which does not make it possible to conclude that one excels the other. Therefore, the discussion between the patient and the ophthalmologist, through a good anamnesis, is essential.

REFERENCES

1. Ana Carolina Dalarmelina Almança; Stella Pereira Jardim; Suélen Ribeiro Miranda Pontes Duarte. **"Epidemiological profile of the patient undergoing cataract surgery."** En: *Revista Brasileira de Oftalmologia* 77.5 (2018), págs. 1-13. doi: 10.5935/0034-7280.20180055.
2. Beatriz de Abreu Fiuza Gomes; Ana Luiza Biancardi; Camila Fonseca Netto; Fernanda Ferreira Pires Gaffree; Haroldo Vieira de Moraes Junior. **"Perfil socioeconômico e epidemiológico dos pacientes submetidos à cirurgia de catarata em um hospital universitário"**. En: *Revista Brasileira de Oftalmologia* 67.5 (2008), págs. 15-20. Issn: 0034-7280.
3. Beatriz de Abreu Fiuza Gomes; Ana Luiza Biancardi; Camila Fonseca Netto; Fernanda Ferreira Pires Gaffree; Haroldo Vieira de Moraes Junior. **"Quality of life and vision post-facectomy"**. En: *Revista Brasileira de Oftalmologia* 77.3 (2018), págs. 119-123. doi: 10.5935/0034-7280.20180026.
4. Beogival Wagner Lucas Santos; José Eduardo Prata Cançado; Vauney Alves da Silva Ferraz; Mauro Campos. **"Avaliação da qualidade de vida em pacientes submetidos à cirurgia de catarata, com implantes de lentes monofocais bifocais e multifocais"**. En: *Revista Brasileira de Oftalmologia* 73.2 (2014), págs. 86-92. doi: 10.5935/0034-7280.20140020.
5. Jennifer R Evans Yasmin Riaz; Samantha R de Silva; **"Manual small incision cataract surgery (MSICS) with posterior chamber intraocular lens versus phacoemulsification with posterior chambre intraocular lens for age-related cataract"**. En: *Cochrane Database of Systematic Reviews* 10 (2013). doi: 10.1002/14651858.CD008813.pub2.
6. OMS. **"Relatório Mundial da Saúde"**. En: (2021). url: <https://apps.who.int/iris/bitstream/handle/10665/328717/9789241516570-por.pdf>.
7. Onofre-Déciga PK; Palacio-Pastrana C; Solís-Hernández C; Pérez-Cano H. **"Social impact indicators in patient diagnosed of senile cataract treated with phacoemulsification plus intraocular lens implantation."** En: *Cirurgia y Cirujanos* 88.3 (2020), págs. 331-336. doi: 10.24875/CIRU.19001372.
8. Passolini D, Mariotti SP, Pokharel GP, Pararajasegarm R, Etyalale D, Negrel AD, et al. 2002 atualização global de dados disponíveis sobre deficiência visual: uma compilação de estudos de prevalência de base populacional. *Epidemiologia Oftálmica* 2004; 11 (2):67-115.
9. Resnikoff S, Passolini D, Etyalale D, Kocur I, Pararajasegarm R, Pokharel GP, et al. Dados globais sobre deficiência visual no ano de 2002. *Boletim da Organização Mundial da Saúde* 2004; 82 (11):844-51.
10. Kara José; Newton Rodrigues; Maria de Lourdes Veronese. *Saúde Ocular e Prevenção da Cegueira*. 2009.