Evaluation of visual function and vision-related quality of life in patients with senile cataract

Avaliação da função visual e qualidade de vida relacionada à visão em pacientes portadores de catarata senil

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ABSTRACT

Purpose: *To investigate the correlation between quality of life and decreased visual acuity in elders with senile cataract.* **Methods:** *A transversal and quantitative study involving 53 elderly patients with senile cataracts and candidates for cataract surgery in a private ophthalmology clinic in Montes Claros, Minas Gerais. For sociodemographic investigation, a questionnaire elaborated by the authors was used. Research on visual-related quality of life was done through the National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25) questionnaire. For statistical analysis, Pearson's correlation coefficient and hypothesis testing were applied, in which the test statistic follows a Student's t distribution, with 5% significance level (p < 0,05).* **Results:** *The majority of the interviewed patients' ages were comprehended between 70 and 79 years old (n.29 / 54,7%) and were female (n.30 / 56,6%). The correlation between the mean score of the "Visual Capacity" domain and of the "Quality of Life" domain had Pearson's correlation coefficient equal to 0,664, statistically significant in Student's t-test (p < 0,001). Therefore, there are evidences that the quality of life and the visual function are correlated so that the better the visual capacity, the better the quality of life.* **Conclusion:** *The correlation between ocular health and functional capacity of the elderly can be obtained by the application the National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25), generating data that reveals the necessity of guaranteed access to ocular health by the elderly population.*

Keywords: *Cataract; Quality of life; Aged; Visual acuity; Cataract extraction*

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Resumo

Objetivo: *Investigar a correlação entre qualidade de vida e diminuição da acuidade visual em idosos portadores catarata senil.* **Métodos:** *Estudo transversal e quantitativo com 53 idosos portadores de catarata senil e candidatos à facectomia em uma clínica oftalmológica particular da cidade de Montes Claros, Minas Gerais. Para investigação sociodemográfica, foi utilizado questionário elaborado pelos autores. A investigação acerca da qualidade de vida relacionada à visão foi feita por meio do questionário National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25). Para análise estatística, aplicou-se o coeficiente de correlação linear de Pearson e Teste de Hipóteses em que a estatística do teste segue distribuição t-Student, com nível de significância de 5% (p < 0,05).* **Resultados:** *A maioria dos pacientes entrevistados apresentava idade compreendida entre 70 a 79 anos (n.29 / 54,7%) e era do sexo feminino (n.30 / 56,6%). A relação de dependência entre o escore médio do domínio "Capacidade Visual" com o do domínio "Qualidade de Vida" obteve coeficiente de correlação de Pearson igual a 0,664, estatisticamente significante ao teste t de Student (p < 0,001). Assim, há evidências de que a qualidade de vida e a função visual estariam correlacionadas de forma que quanto maior a capacidade visual, maior seria a qualidade de vida.* **Conclusão:** *A correlação entre saúde ocular e capacidade funcional de idosos pode ser obtida pela aplicação do National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25), gerando dados que revelam a necessidade da garantia de acesso da população idosa à saúde ocular.*

Descritores: *Catarata; Qualidade de vida; Idoso; Acuidade visual; Extração de catarata*

Introduction

Cataract is defined as the opacification of the lens, and it may affect vision, or not.[1] Currently, it is the main cause of blindness in the world, since it accounts for 74.8% of visual impairment cases, along with unrectified refractive errors.[2-4] Cataract is a preventable form of blindness because it has effective treatment.[5,6] This disease can be classified as congenital or acquired, and aging is the main risk factor for its development.[1] The increased prevalence of the disease among older age groups has confirmed such an statement. Disease prevalence reaches 17.6% in the age group younger than 65 years; whereas its prevalence reaches 73.3%. in individuals older than 75 years.[2]

Senile cataract is defined as that occurring after the age of 50 years, without any other condition to justify its development.[2] This cataract type is related to a constitutive process in the organism, which results from oxidative damage accumulation and from eye damage over the years.[7] The incidence of chronic degenerative diseases, including senile cataract, is increasing, given nowadays higher life expectancy. The Brazilian Ophthalmology Council estimates 120,000 new senile cataract cases a year due to Brazilian population aging.[2] Studies point out that visual loss is an important impact factor for elderlies' morbidity and mortality, since it increased the risk of falls, physical disability, depressive symptoms and the difficulty in performing daily living activities.[6,8,] Such a fact highlights the need of adjusting health services to the new profile of the population. Moreover, the psychosocial consequences of cataract visual impairment must be taken into account. It is essential assessing the correlation between the disease and quality of life reduction in the elderly population, since it could guide future public policies aimed at diagnosing and treating this comorbidity in the target population.

Cataract preventive methods are desirable; however, they do not exist. Curative cataract treatments are surgical; currently, the method of choice consists of surgery through phacoemulsification. Based on this procedure, the opaque ocular lens is emulsified, aspired and the intraocular lens is implanted.[9,10] It is important highlighting that this procedure is recommended when the patient's quality of life is compromised due to difficulty in carrying out daily activities.[7] Most patients do not have serious operative complications, and they often are highly satisfied with the outcomes.[10-13]

According to the World Health Organization (WHO), 80% of blindness cases can be prevented through the national implementation of preventive, diagnostic and therapeutic programs, in time. The VISION 2020 project was launched in 1999 by WHO in partnership with the International Agency for the Prevention of Blindness. This aim of this initiative was to eliminate preventable blindness by 2020. In 2013, WHO launched the Universal Eye Health: A Global Action 2014-2019, which aimed at reducing preventable visual impairment prevalence by 25%, by 2019.[14] Therefore, those are the global efforts to fight the growing number of treatable eye diseases, mainly cataract, in the elderly population, which is more susceptible to damages caused by this disease.[11] Policies to fight blindness caused by senile cataract involve increased cataract surgery supplies, since it has been is historically known for being lower than the demand.[2]

The aims of the current study were to assess visual function and quality of life related to vision in senile cataract patients.

Methods

Cross-sectional, quantitative study, comprising 53 patients aged over 60 years, with senile cataract and cataract surgery candidates attended in a private eye clinic in Montes Claros City, Minas Gerais State/Brazil. Data were collected from March to December 2019.

Instruments

A questionnaire prepared by the authors was used for sociodemographic investigation, based on the Brazilian Institute of Geography and Statistics (IBGE) standard. It addressed the following variables: sex; age; race/ethnicity; marital status; schooling; monthly family income; perception about monthly family income sufficiency; health insurance and frequency of direct SUS using (Unified Health System). Quality of life related to visual function was investigated based on the National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25).

This instrument consists of 25 questions to assess 12 visual – function subdomains: general health; general vision; eye pain; near vision; distance vision; near vision difficulty with activities; responses to visual issues; social aspects; mental health; daily life activity; dependency; ability to drive cars; color vision and peripheral vision. Each question had five or six optional answers that corresponded to the score 0 to 100 (0, 25, 50, 75, 100). With respect to questions with six optional answers, the sixth answer was is not counted for the final average, in case it was the chosen

one. Finally, it was possible calculating the mean score recorded by patients in each visual–function subdomain. Scores closer to 100 indicated better performance in the approached function.

Procedures

The current research was previously approved by the Ethics Committee of Montes Claros State University (n. 2,702,521/2018). Standards in resolution 466/12 by the National Health Council were followed. Interviews were conducted in a private ophthalmology clinic in Montes Claros City, Minas Gerais State/Brazil. Interviewers had two days a week to apply the questionnaires, right before the cataract surgery. All interviewees had access to the informed consent form and signed it before agreeing in participating in the research. The time to apply the questionnaire was of approximately 10 minutes, with each patient, alone.

Statistical Analysis

Data analysis was carried in R software. Pearson's linear correlation coefficient and Hypothesis Test were performed. The statistical test followed the t-Student distribution at 5% significance level. In other words, it took into consideration p-value lower than 0.05 as significant.

RESULTS

Most patients were women (n. 30 / 56.6%), in the age group 70 to 79 years (n. 29 / 54.7%), who have declared themselves white (n.24 / 45 ,3%) and married (n.31 / 58.5%). Prevailing schooling was incomplete Elementary school (n. 21 / 39.6%), and it was followed by complete high school (n. 12 / 22.6%). Regarding family income, part of the interviewees chose not to answer (n. 14 / 26.4%), most individuals (n. 13 / 24.5%) declared to live on income ranging from R$ 954.00 to 1,500.00, and it was followed by the ones living on income ranging from R$ 1,500.00 to R$ 2,500.00 (n. 9 / 17%). More than half of them classified their income as sufficient (n. 31 / 58.5%) and claimed to have health insurance (n. 28 / 52.8%). Most interviewees reported not to use services offered by the Unified Health System (SUS) (n.19 / 35.9%) (Table 1).

Based on the responses to the NEI-VFQ 25 questionnaire, it was possible describing, the more and lesser affected subdomains in cataract patients who participated in the research, among the 12 functional capacity subdomains assessed by the method. General vision was the most compromised functional capacity subdomain, which recorded mean score of 37.9. Social aspects was the subdomain accountable for the highest mean score; therefore, social aspects was he least compromised among the interviewed patients, and it recorded score of 94.54, as shown in Table 2.

The assessed subdomains were divided into two major domains in order to describe the possible correlation between visual capacity and quality of life, namely: "Visual capacity" - including General Vision; Eye Pain; Near Vision; Distant Vision and Color Vision; Peripheral Vision -; and "Quality of Life" - including Social Aspects; Mental Health; Daily Life Activities and Dependence. It was possible noticing how the mean score of visual capacity and quality of life domains was distributed in the assessed group. Most patients recorded mean score between 75 and 100 in both domains, "visual capacity" (n. 28 / 52.83%) and "quality of life" (n. 38 / 71.7%), as shown in Figures 1 and 2, and in Table 3.

The current research tried to verify a possible relationship between the average score of the domain "Visual Capacity" with the domain "Quality of Life". Pearson's correlation coefficient

Table 1
Sociodemographic data of senile cataract patients

Variables	N/53	%
Sex		
Men	23	43,4
Woman	30	56,6
Age		
60-69	18	34
70-79	29	54,7
≥ 80	6	11,3
Race/Ethnicity		
White	24	45,3
Brown	23	43,4
Black	6	11,3
Marital Status		
Single	4	7,5
Married	31	58,5
Divorced or separated	2	3,8
Widowed	16	30,2
Schooling		
Illiterate or less than a year of education	6	11,3
Incomplete Elementary School	21	39,6
Complete Elementary School	7	13,2
Complete High school	12	22,6
Incomplete Higher Education	1	1,9
Major Degree	6	11,3
Monthly Family Income		
Less than one minimum wage	6	11,3
$954 to $1500	13	24,5
$1500 to $2500	9	17
$2500 to $3500	9	17
$3500 to $500	2	3,8
Rather not answer	14	26,4
Do you consider your family income sufficient?		
Yes	31	58,5
No	22	41,5
Do you have health insurance?		
Yes	28	52,8
No	25	47,2
How often do you use SUS' services?		
Always	7	13,2
Often	12	22,6
Rarely	15	28,3
I do not use it	19	35,9

found was equal to 0.664, which shows a moderate positive correlation. When applying the Student's t test, such correlation proved to be statistically significant (p-value <0.001). Therefore, there is evidence that the psychosocial aspects of quality of life and aspects of visual function would be correlated in such a way that the greater the visual capacity, the greater the quality of life, the reverse being also true that, the greater the damage the visual capacity, the worse the individual's quality of life would be.

DISCUSSION

Fifty-three patients were interviewed, 30 (56.6%) of them were women and 23 (43.4%) were men, at mean age of 71.7 years - similarly to what was reported in Bali/Indonesia, where

Table 2
Mean score recorded for each subdomain assessed through NEI-VFQ-25 and classified from the most compromised to the least compromised.

Subdomain	Mean score	Standard Deviation	Classification
1. General Health	42,92	23,70	2º
2. General Vision	37,98	22,41	1º
3. Eye Pain	82,54	25,39	8º
4. Near Vision	69,96	33,95	4º
5. Distance Vision	67,45	32,70	3º
6. Social Aspects	94,54	14,63	12º
7. Mental Health	75	33,01	6º
8. Daily Life Activities	74,29	34,92	5º
9. Dependence	76,25	33,25	7º
10. Ability To Drive Cars	83,04	26,39	9º
11. Color Vision And	92,92	17,24	11º
12. Peripheral Vision	85,57	21,77	10º

Table 3
Distribution of patients based on the mean score recorded for the Visual Capacity and Quality of Life domains

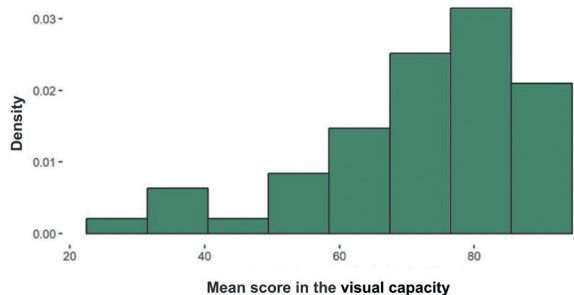| Mean Score	Visual Capacity n (%)	Quality of Life n (%)
0|-25	0 (0,00)	1 (1,89)
25|-50	5 (9,43)	2 (3,77)
50|-75	20 (37,74)	12 (22,64)
75|-|100	28 (52,83)	38 (71,70)
Total	53 (100)	53 (100)

Figure 1. Distribution of patients based on the mean score recorded for the Visual Capacity domain.
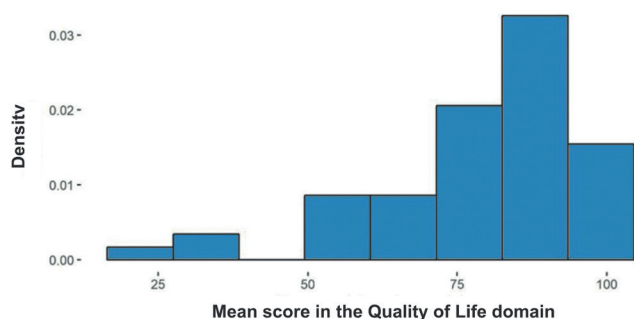

Figure 2. Distribution of patients based on the mean score recorded for the Quality of Life domain

the mean age of 547 elderly patients with senile cataract was 70 years.[16] Women prevalence in the sample was consistent with results in a survey conducted in Aracajú City, where 54 patients were interviewed - women also prevailed in this sample (61.1%). These numbers can be associated with senescence process feminization in Brazil.[8,10] It was possible noticing that 24 (45.3%) patients declared themselves white, whereas 23 (43.4%) of them declared themselves brown and 6 (11.3%) as black. Most participants (58.5%) declared themselves married. Similar data were verified in a study carried out in Rio de Janeiro City, where the white ethnic group accounted for 71 (48%) cases; browns, for 55 (37.2%) and blacks, for 17 (11.5%) cases. In addition, 54.7% of participants were married.[17]

Regarding schooling, 21 (39.6%) patients did not complete Elementary school, and 12 (22.6%) completed High school. These data are proportional to those reported in another study.[17] Research conducted in São Paulo City found that most interviewees (60.7%) had completed Elementary school.[18] In Bali, Indonesia, of 547 interviewees, approximately 50% attended school, but only 2.5% completed High school.[16] Therefore, it was possible comparing schooling parameters of Brazilian elderlies to Indonesian elderlies. With respect to income, most patients who has signed the consent form (24.5%) said they earned between R$ 950.00 and R$ 1,500.00 a month. Such a fact can be compared to values found in a research carried out in 2007, in which 30.1% of the 83 patients stated that they received salary lower than R$ 500.00. [17] However, the R$ 618.00 difference between minimum wage in 2007 and in 2019 must be taken into account. Therefore, it seems that low family income is a persistent issue despite the governmental efforts to stop it.

In 2000, a cataract task force was held at São Paulo University Clinical Hospital. It interviewed 299 patients and results have shown absence of individuals whose health insurance offers all the resources for cataract surgery performance under free care provision.[18] As for the current study, 19 (35.9%) patients stated not to use SUS and, most of them (52.8%) said to have health insurance. A survey conducted in Porto Alegre City showed that primary health care service users prevail among people with lower socioeconomic status and without health insurance.[19] Such fact justifies the low adherence to public health services by the assessed sample.

WHO estimates that Brazil will be the sixth country with the largest number of elderly people in the world in 2025,[4] with approximately 32 million people over 60 years. Emotional, psychological and functional changes that have direct impact on results based on information in the questionnaire, as well as aging.[20,21] Such a fact is confirmed by findings in the current study, which evidenced that the mean scores obtained by patients in domains related to quality of life are directly proportional to those of visual capacity.

"General vision" was the subdomain accounting for the lowest score in the present study. It recorded 37.98 points, and this number is supported by other studies that have also used the NEI-VFQ 25.[22-24] Studies conducted with 156 elderly individuals in Macapá (Amapá State/Brazil) have shown great increase in the scores (from 29.65 to 89.87) recorded for this subdomain after the cataract surgery. This finding shows that cataract correction allows significant improvement in patients' visual acuity.[23]

The mean score recorded for the general health subdomain was 42.92 - the second lowest score was also verified. A survey conducted in Vietnam with 413 patients with bilateral cataract

has demonstrated that the lowest scores are related to general health, with mean score of 30.97; this finding corroborates the current results.[25] Studies have shown that the "General Health" subdomain presents a peculiarity in the senile population: elderlies' perception about their health improves and accounts for low scores even after cataract surgery.[22,26] A study carried out in Japan showed that scores recorded for all subdomains of the 88 patients subjected to the procedure increased significantly, except for the "general health" subdomain.[26]

Decreased visual acuity, "cloudy or foggy" vision, greater sensitivity to light and decreased depth perception are among the main complaints related to cataracts.[7] Visual acuity is defined as the ability to discriminate shapes or as the function of recognizing angular separation between two points in space.[8] Subdomains related to distant vision and near vision are essentially dependent on visual acuity; moreover, they are among the most affected by cataract. They ran the third and fourth places in the score, with mean scores of 67.45 and 69.96, respectively.

On the other hand, the item "Color Vision" accounted for high scores in the current research, it was assessed as the second best score. A study carried out in Greece with 220 patients showed score of 100, which is the highest score possible for the "Color Vision" domain - it is achieved when all patients report not to have difficulty in the assessed function. These results do not necessarily indicate that cataract do not impair color differentiation, but that patients' perception about this impairment has less impact on their daily lives.[24]

When domain "Ability to Drive Cars" was assessed, it was possible noticing that most (63.03% / N = 35) patients never drove, and such a profile can be related to their socioeconomic features. A study carried out in Campinas (São Paulo State), with 40 patients, showed similar result: 60% respondents never had driven a car.[27] Due to the relationship with factors other than just visual function, this and other studies have suggested that domain "Ability to Drive Cars" is not statistically significant in the ophthalmic evaluation of patients in public hospitals in Brazil.[22,23,27] Scores recorded for this subdomain were not included in the statistical analysis, in the current study.

The social aspect accounted for the best score in the current study, and this finding is very favorable for patients' prognosis, since social isolation is the factor mostly impacting elderlies' mental health.[4,23,28] These data must be known by the health team, since therapeutic approach would be more effective if it was shared with the "Mental Health", "Dependence" and "Daily Life Activities" fields, which accounted for scores lower than that recorded for "social aspects".

CONCLUSION

It is possible relating eye health to patients' functional capacity, since vision loss is an important source of damage in several subdomains of ones' life. The application of the National Eye Institute - Visual Function Questionnaire 25 (NEI-VFQ 25) allowed knowing the effects of chronic eye disease and the repercussion of its treatment in patients' daily lives. Therefore, the questionnaire should be seen as complementary tool to clinical examination, which should be used to determine the success of previously performed surgical procedures. In addition, it is possible observing that it is essential guaranteeing the access of this population to adequate eye care given benefits related to cataract surgery observed in elderlies' daily lives. Therefore, one

must make sure that conditions such as cataract must be properly diagnosed and treated in order to ensure elderlies' physical, mental and social health.

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