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Assessment and Comparison of Glaucoma Knowledge Between a Group of Patients with and without Glaucoma Diagnosis

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Abstract

Background: Glaucoma is a chronic, irreversible optic nerve neuropathy characterized by loss of visual field, which can evolve to

blindness if not treated properly. This study aims to assess the level of knowledge about glaucoma between a group of diagnosed patients and a healthy group. **Methods:** 50 glaucoma patients (group A) of Ophthalmology service of Centro Universitário FMABC were required to answer a validated questionnaire. 50 patients without diagnosed glaucoma (Group B), answered the same questionnaire. Sociodemographic data were recorded, a source of information on the disease of 50 patients in Group A and 65 in Group B and, in group A, it was also asked for how long they have been diagnosed. **Results:** In the glaucoma group, 52% were female and 48% were male. In the healthy group, 66% were women and 34% were men. The mean age of group A was 66.4 years and that of group B was 55.7 years. All glaucoma patients reported knowing the disease, while 23% of Group B were unaware of the disease. 54% of Group A patients did not know that vision loss in glaucoma is slow and 46% of them reported that the disease is mostly painful. The mean score of the questions in Group A and Group B was 12.08 and 10.66, respectively (p=0.0098). **Conclusion:** Patients with glaucoma know more about the disease than patients without glaucoma but seem unaware of the aggravations of this disease. This study suggests the need to improve the population's knowledge about the disease and the prevention of blindness.

Keywords: Glaucoma; Patient Education; Ophthalmology

Introduction

Glaucoma is a chronic optic neuropathy that causes progressive and irreversible degeneration of retinal ganglion cells. Because of this, the visual field is gradually lost, which can lead to blindness in more advanced stages (Doucette, Rasnitsyn, Seifi, & Walter, 2015; Weinreb & Khaw, 2004). Glaucoma is the second leading cause of blindness worldwide – followed by cataract – and the leading cause of permanent blindness recognized by the World Health Organization (WHO). And, despite being irreversible, it is subject to control. With the aging of the population, it is expected that by the end of 2020, there will be 80 million and, by 2040, more than 111 million glaucomatous people worldwide (Tham et al., 2014).

The evolution of this pathology is slow and usually asymptomatic. Reports of low visual acuity usually denote advanced stages of glaucoma. The control of intraocular pressure (IOP) is the basis of the treatment, which aims to reduce or even stop the degeneration of retinal ganglion cells to prevent the progression of the neuropathy (Doucette et al., 2015). The therapeutic options are mainly hypotensive eye drops, followed by laser procedures and, in moderate or advanced cases, of difficult IOP control,

surgeries are an option (Gordon et al., 2002; Heijl et al., 2002; Rudnicka, Mt-Isa, Owen, Cook, & Ashby, 2006).

Glaucoma is a highly incident chronic disease that can lead to irreversible blindness, with early diagnosis, long-term follow-up and treatment being able to prevent the progression of the disease[1]. However, studies performed in both underdeveloped and developed countries have shown that access to ophthalmic resources and information are one of the main obstacles to adherence to the treatment for glaucoma (Livingston et al., 1995; Miglior et al., 2007; Rewri & Kakkar, 2014; Sathyamangalam et al., 2009). Patient adherence to treatment is a constant challenge and is recognized as an essential component of the therapeutic plan.

Several studies state that one of the causes of low adherence to glaucoma treatment is related to the patient's lack of knowledge about the disease itself and its treatment. Social and economic factors are also associated with low therapeutic adherence (Cintra, Costa, Tonussi, & Jose, 1998; Friedman et al., 2008; MacKean & Elkington, 1983; Norell, 1979; Spaeth, 1970).

Due to the lack of knowledge about glaucoma, there is a low adherence to treatment. This study aims to evaluate the knowledge about glaucoma among a group of patients with glaucoma and compare it with participants without the disease treated at the ophthalmology outpatient clinics of the Centro Universitário FMABC.

Material and Methods

50 glaucoma patients (Group A) under follow-up at the Ophthalmology department of Centro Universitário FMABC, and 50 patients without diagnosed glaucoma (Group B) from other outpatient clinics, answered the same questionnaire composed of 22 true/false statements about the signs and symptoms, associations, and treatment of glaucoma. Patients were required to answer if the statement was true or false

Sociodemographic data were also recorded, a source of information about the disease from 50 patients in Group A and 65 in Group B and, in the case of the glaucoma patients, it was also asked since when they have been diagnosed with the disease.

The questionnaire was applied by the researchers to the patients individually. The questions were read exactly as described in the questionnaire and the patient should answer whether the statement was true or false. The response time was varied according to the need of each patient, so there was no time limitation for the answers.

Inclusion criteria for Group A: diagnosis of glaucoma; older 18 years; no diagnosis of dementia; literate. Exclusion criteria for this group were: under 18 years of age; diagnosis of dementia; and illiterate.

Inclusion criteria for Group B: no previous diagnosis of glaucoma; over 18 years old, no diagnosis of dementia; and literate. Exclusion criteria for this group were: under 18 years of age; diagnosis of dementia; illiterate; and previous knowledge about glaucoma.

This study was approved by Research Ethics Committee of the Centro Universitário FMABC (protocol: 4.427.013). All volunteer subjects were informed about the study and invited to participate after signing the Free and Informed Consent Form. The present study was conducted in accordance with the relevant guidelines and regulations/ethical principles of the Declaration of Helsinki.

Statistical Analysis

Descriptive data analysis was performed. To characterize and summarize the results, the qualitative variables were presented by absolute frequency and relative frequency, the quantitative variables were presented by measures of central tendency, measures of variability and 95% confidence interval (95% CI) by means of the Shapiro-Wilk test data normality test. To compare gender, race, education, knowledge of the disease and sources of information according to group and to compare the correct answers for each question of the questionnaire according to group, the Chi-square test was used. The Mann-Whitney test was used to compare age according to group. In addition, the percentages of correct answers between gender, race and education in the group with glaucoma and in the group without glaucoma were compared by Student's t-test. In addition, the percentages of correct answers with age in the group with glaucoma and without glaucoma were compared by Spearman's correlation test. When comparing the time of diagnosis of glaucoma (in patients with the disease) with the percentage of correct answers, the ANOVA test was used. The level of confidence adopted was 95% and the level of significance adopted was $p<0.05$. The statistical software used was Stata version 11.0.

Results

Figure 1 describes the research sample. 115 patients were obtained, 50 from Group A and 65 from Group B. Of this last group, 15 patients had no awareness of the disease, thus they only answered the research form.

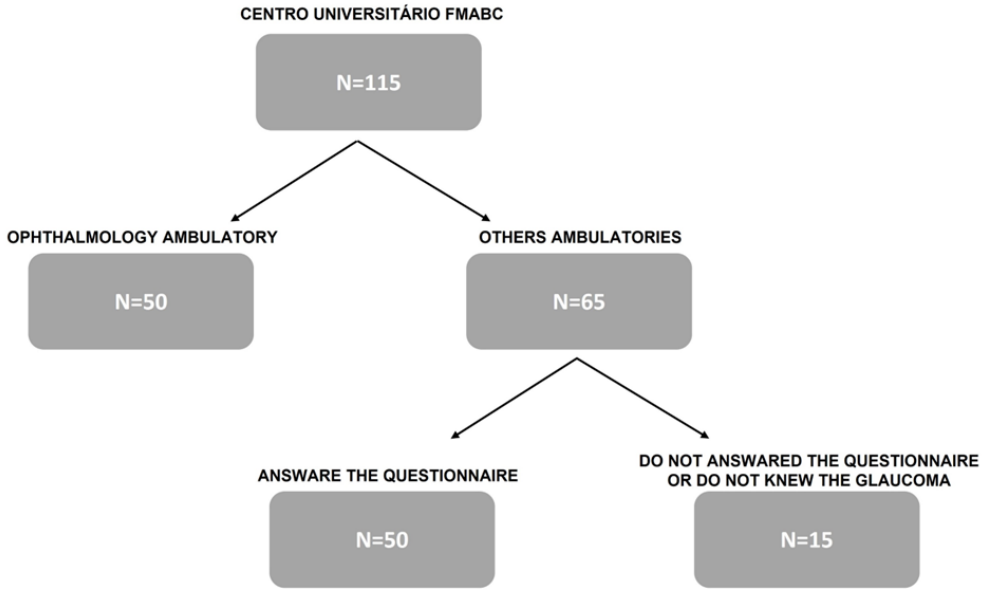

Figure 1: Description of the sample

Sociodemographic data

Sociodemographic data were compared between the study groups and are described in Table 1.

Table 1. Comparison of gender, age, race, education, knowledge of the disease and sources of information according to group

Variables	No glaucoma n (%)	Glaucoma	p*
Gender			
Male	22 (33.85)	24 (48.00)	0.125
Female	43 (66.15)	26 (52.00)	
Race			
White	40 (61.54)	20 (40.00)	
Black	10 (15.38)	8 (16.00)	
Mixed	15 (23.08	18 (36.00)	0.053
Yellow	0 (0)	3 (6.00)	
Other#	0 (0)	1 (2.00)	
Education			
No education	3 (4.62)	2 (4.00)	
IES	19 (29.23)	27 (54.00)	
CES	10 (15.38)	7 (14.00)	0.154
IHS	6 (9.23)	3 (6.00)	
CHS	22 (33.85)	9 (18.00)	
CHE	5 (7.69)	2 (4.00)	
Knows glaucoma			
Yes	50 (76.92)	50 (100)	<0.001
No	15 (23.08)	0 (0)	
Source:			
Family members	23 (46.00)	7 (14.00)	<0.001

Doctor	14 (28.00)	41 (82.00)	
Media (TV, Internet and radio)	5 (10.00)	1 (2.00)	
Other***	8 (16.00)	1 (2.00)	
	Median (95%CI)		p **
Age (years)	59 (54.10; 62.89)	67.5 (63,53; 71.46)	<0.001

*Chi-square test. **Mann-Whitney test. 95%CI 95% Confidence Interval ***Neighbors. #Indigenous.

Female sex prevailed in both groups, 52% in group A and 66.1% in group B (p = 0.125).

Regarding race, in Group A 40% are white, 36% mixed 16% black and 6% yellow. In Group B, 61.6% are white, 15.4% black and 23% mixed (p = 0.053).

The median age in the groups with and without glaucoma was 67.5 and 59 respectively (p < 0.001).

A mean age in the glaucoma group was 66.38 years; in the healthy group was 55.67 years. The oldest age in the group with glaucoma was 84 years and the youngest was 35. In the group without glaucoma, the older patient is 88 years old and the younger one is 18. The age range between 65 and 74 years was the most prevalent in Group A, corresponding to 34%; in Group B, the range that prevailed was between 55 and 64 years, corresponding to 30.7%.

Regarding the level of education of Group A, 6% finished higher education, 18% completed high school, 6% had incomplete high school, 14% finished elementary school, 54% did not complete elementary school and 4% had no education. Regarding the education of Group B, 9.2 finished higher education, 38.8% finished High School, 9.2% had incomplete high school, 15.3% finished elementary School, 29.2% did not complete Elementary School and 4.6% had no education (p = 0.154).

All 50 patients in Group A reported knowing about the disease while 50 (76.9%) patients in Group B knew about glaucoma and 15 (23%) did not (p < 0.001).

The sources of information on glaucoma were compared between the groups and are described in Table 1. For patients in group A, doctors accounted for 82% as the information source, family members for 14%, the media and other sources for 2%. In Group B, doctors corresponded to 28%, family members to 46%, media to 10% and other sources to 16% (p < 0.001).

Among glaucoma patients, 8% had been diagnosed with the disease for less than 1 year, 14% for over 1 up to 2 years, 22% for over 2 up to 5 years, 28% over 5 up to 10 years and 28% for more than 10 years. (Table 2)

Table 2. Variation in the age of the two groups and the time of diagnosis in the glaucoma group

Variables	Glaucoma group (n = 50)	Group with no glaucoma (n = 65)
Age		
18 to 24 years	0	5
25 to 34 years	0	3
35 to 44 years	3	5
45 to 54 years	3	12
55 to 64 years	14	20
65 to 74 years	17	15
Over 75 Years	13	5
Mean	66.38	55.67
Diagnosed for how many years?		
Less than 1 year	4	NA
Over 1 and up to 2 years	7	NA
Over 2 and up to 5 years	11	NA
Over 5 and up to 10 years	14	NA
More than 10 Years	14	NA

NA Not applicable.

Table 3 describes the comparison of the percentage of correct answers of the questionnaire according to the sociodemographic data of both groups.

Regarding gender, the mean score in the group without glaucoma was 47.05 in males and 49.17 in females (p = 0.529); in the glaucoma group it was 57.76 in males and 52.27 in females (p = 0.145).

Regarding race, the mean score of correct answers in the group without glaucoma was 49.24 in white, 46.59 in black and 47.72 in mixed (p=0.814); in the group with glaucoma it was 52.72 in white, 55.68 in black, 56.56 in mixed 57.57 in yellow and 54.54 in indigenous (p = 0.921).

Regarding educational level, the mean of correct answers in the group without glaucoma was 40.9 in patients without education, 44.05 with Incomplete Elementary School, 45.95 with Complete Elementary School, 43.93 with Incomplete High School, 52.63 with Complete High School and 55.68 with Complete Higher Education (p = 0.135); in the group with glaucoma, the mean of correct answers was 54.54 in patients with no education, 56.22 with Incomplete Elementary School, 52.59 with Complete Elementary School, 48.48 with Incomplete High School, 55.55 with Complete High School and 52.27 with Complete Higher Education (p = 0.944).

Age and percentage of correct answers in the groups with and without glaucoma were not correlated (rho = - 0.235 and p = 0.1 in the group without glaucoma and rho = - 0.03 and p = 0.844 in the group with glaucoma).

Table 3. Comparison of the percentage of correct answers according to gender, age, race and education according to group with and without glaucoma

Variables	Score percentage			
	No glaucoma	p	Glaucoma	p
	Mean (95% CI)		Mean (95% CI)	
Gender				
Male	47.05 (41.83; 52.28)	0.529*	57.76 (52.38; 63.14)	0.145*
Female	49.17 (45.03; 53.31)		52.27 (46.84; 57.70)	
Race				
White	49.24 (45.10; 53.37)		52.72 (45.77; 59.67)	
Black	46.59 (34.44; 58.73)		55.68 (44.41; 66.94)	
Mixed	47.72 (41.75; 53.69)	0.814#	56.56 (50.06; 63.06)	0.921#
Yellow	-		57.57 (40.32; 74.82)	
Other #	-		54.54 (-)	
Education				
No education	40.90 (40,90; 40.90)		54.54 (-3.21; 112.30)	
IES	44.05 (37.10; 51.00)		56.22 (50.64; 61.80)	
CES	45.95 (38.66; 53.25)	0.135#	52.59 (37.08; 68.11)	0.944#
IHS	43.93 (20.43; 67.44)		48.48 (24.97; 71.99)	
CHS	52.63 (47.34; 57.91)		55.55 (45.70; 65.40)	
CHE	55.68 (37.59; 73.76)		52.27 (23.39; 81.15)	
	rho		**rho**	
Age (years)	-0.235	0.100**	-0.03	0.844**

* Student's t test #Anova Test. ** Spearman correlation test. 95%CI: 95% Confidence Interval

The comparison between the percentage of correct answers in relation to the time of diagnosis of patients with the disease (p = 0.432) ranged from 51.62% to 60.71%. Patients with more than 10 years of diagnosis had the highest mean of 60.71% while patients with less than 1 year of diagnosis had a mean of 52.27%. The group with the lowest mean score was related to patients diagnosed between 5 and 10 years (Table 4).

Table 4. Comparison between score percentage and the time of diagnosis in patients with glaucoma

Time of diagnosis	Glaucoma	p*
	Mean (95% CI)	
Less than 1 year	52.27 (18.60 – 85.93)	
Over 1 and up to 2 years	53.24 (40.46 – 66.02)	
Over 2 and up to 5 years	53.71 (44.78 – 62.65)	0.432
Over 5 and up to10 years	51.62 (43.41 – 59.83)	
More than 10 Years	60.71 (55.50 – 65.92)	

*ANOVA Test. 95%CI: 95% Confidence Interval

The mean score of the questions in Group A and Group B was 12.08 (11.25 – 12.90) and 10.66 (9.96 – 11.35), respectively (p=0.0098). The percentage of correct answers in the group with glaucoma was 51.68% and in the group without the disease, 48.45% (p=0.0098).

When comparing correct answers for each question according to group, statements 7 ("The most common treatment for glaucoma is surgery") and 18 ("Fluorescent will make glaucoma worse") were statistically significant (p = 0.003 and p = 0.047 respectively). In addition, statements 2 ("Most glaucoma is painful"), 6 ("Glaucoma can be cured") and 10 ("Treatment for glaucoma is lifelong") had a p-value close to 0.05. (Table 5)

Table 5. Comparison of correct answers for each question of the questionnaire according to group

Nº	Statements	Score percentage (%)		p*
		Glaucoma	No glaucoma	
		n (%)		
1	Glaucoma affects only the eye and no other part of the body	45 (90)	44 (88)	0.749
2	Most glaucoma is painful	23 (46)	31 (62)	0.070
3	Raised eye pressure can cause glaucoma	48 (96)	45 (90)	0.240
4	Glaucoma affects central vision before side vision	17 (34)	14 (28)	0.517
5	Vision loss in glaucoma usually occurs very quickly	27 (54)	35 (70)	0.099
6	Glaucoma can be cured	30 (60)	21 (42)	0.072
7	The most common treatment for glaucoma is surgery#	30 (60)	15 (30)	0.003
8	Lost eyesight from glaucoma can be restored	37 (74)	30 (60)	0.137
9	Most people with glaucoma go blind	19 (38)	15 (30)	0.398
10	Treatment for glaucoma is lifelong.	48 (96)	43 (86)	0.081
11	Regular check-ups are not necessary for glaucoma patients	47 (94)	47 (94)	1.000
12	Glaucoma can run in families	28 (56)	29 (58)	0.840
13	Glaucoma is more common as you get older	35 (70)	37 (74)	0.656
14	Most people have symptoms that warn them that their glaucoma is getting worse	9 (18)	9 (18)	1.000
15	Stress can make glaucoma worse	12 (24)	6 (12)	0.118
16	A healthy diet prevents the aggravation of glaucoma	19 (38)	12 (24)	0.130
17	Using computer can make glaucoma worse.	12 (24)	8 (16)	0.220
18	Fluorescent lights will make glaucoma worse#	19 (38)	10 (20)	0.047
19	Eye drops for glaucoma may have side-effects that affect other parts of the body	10 (20)	7 (14)	0.424
20	Watering eyes is a sign of a build up of fluid inside the eye	18 (36)	13 (26)	0.280
21	A lot of reading can make glaucoma worse	22 (44)	20 (40)	0.685
22	Lowering the eye pressure is a treatment that can prevent the worsening of glaucoma	47 (94)	49 (98)	0.307

*Chi-square test. #Statistically significant ($p<0.05$)

Overall score of the questionnaire in each group is described Table 6. Statements 1,3,10,11 and 22 had 75% or more correct answers in both groups. Statements 14,15,17 and 19 had less than 25% of correct answers in both groups. The correct answers of group A were higher than those of group B in 15 questions. The median score of the glaucoma group was 54.7% and of the control group was 49%. Statement 7 of the questionnaire ("The most common treatment for glaucoma is surgery") was that group A had the highest difference of correct answers in relation to B, this difference was 30%. Statements 2 ("Most glaucoma is painful") and 5 ("Visual loss in glaucoma usually occurs very quickly") were the ones that healthy group score more than the glaucoma group, the difference in correct answers was 16%.

It was noted that both patients in Group A and Group B have finished high school or higher education and obtained a higher percentage of correct answers when compared to those who had less education.

Table 6. Comparison of education level with the percentage of correct answers between the groups

Schooling Level	Group A (%)	Group B (%)
Without schooling	40.9	56.81
EFI	44.05	52.86
EFC	45.95	51.29
EMI	43.93	54.54
EMC	52.63	61.61
ESI	0	0
ESC	55.68	63.63

Note: IES Incomplete elementary school education; CES: Incomplete elementary school education; IHS: Incomplete high school education; CHS: Complete High School education; IHE: Incomplete higher education; CHE: Complete Higher Education

Among glaucoma patients, it was observed that those with more than 10 years or less than 1 year of diagnosis, had the highest percentage of correct answers, 58.76% and 60.22% respectively.

The patients, both in Group A and Group B, who obtained information about glaucoma through the media (TV, Internet and Radio), were the ones who had the highest percentage of correct answers to the questions, 63.63% and 54.54% respectively.

Discussion

The present study demonstrated that the level of education is not a determining factor in relation to the knowledge about glaucoma in both groups. Hoevenaars et al. (Hoevenaars, Schouten, van den Borne, Beckers, & Webers, 2005) have associated the lack of knowledge of 166 patients about glaucoma and the treatment used, to the low level of education, the short duration of glaucoma and advanced age. In the study by Costa et al. (Costa et al., 2006), two populations of different cultures were compared, one in the *Wills Eye* Hospital (Philadelphia, United States), and another in the glaucoma service of Unicamp (Campinas, Brazil). In both groups, knowledge of glaucoma was correlated with the level of education of patients. It is possible that this difference is attributed to the smaller sample of the present study.

The data of this study showed that all patients with glaucoma declared to be aware of the disease, unlike the group of patients without glaucoma, in which 23% reported to be unaware of it. Thus, this study suggests that there is a good doctor-patient relationship in the care of the FMABC ophthalmology outpatient clinic.

More than 75% of patients, glaucomatous or not, have been shown to know the following characteristics of glaucoma: that it affects exclusively the eye, that it is related to raised intraocular pressure, it requires a lifelong treatment and it must be regularly followed-up by ophthalmologists. This greater knowledge about this information may be attributed to the fact that they are the most widespread in the community.

The source of information identified by the group with glaucoma was mainly doctors (82%) and family members (14%). In the group without the disease, doctors accounted for 28% and family members for 46%. This comparison was statistically significant. The media (television, internet and radio) did not prove to be an important source of information to the interviewees. The positive association between having a better knowledge about the disease and having a family member with the disease has already been demonstrated in other studies (Amaral, Andrade, da Fonseca, & Perez, 2020; Gasch, Wang, & Pasquale, 2000). There was no statistically significant relationship regarding gender, race and education when comparing the groups.

Patients without glaucoma had the greatest difference of correct answers in relation to patients with the disease in two statements. Glaucoma patients stated that the disease causes pain and quick loss of vision. This may be attributed to the moment when the patients have got the diagnosis of the disease, that is, when already with some visual impairment. And that this referred pain may be a discomfort. On the other hand, patients with glaucoma had the greatest difference in correct answers than patients without the disease in statement 7, in which they stated that surgery is the most common treatment. This difference may reveal the lack of information in society about the treatment for glaucoma.

The questionnaire (Annex 2) composed of 22 statements was validated in a cross-sectional study conducted in 2008 by Danesh-Meyer et.al. (Danesh-Meyer et al., 2008), the researchers have compared the knowledge about glaucoma in patients with the disease and others without it. The group with glaucoma was subdivided into 2 groups: those with glaucoma already established for 6 months or more and those referred for the first evaluation of a possible glaucoma. In the study sample, 208 patients with established glaucoma, 100 new patients with glaucoma and 100 healthy patients were recruited. The centers participating in this study were public hospitals, private clinics and private universities in New Zealand. The level of knowledge was obtained by applying the questionnaire to the 3 groups.

When comparing the results of the New Zealand study with the present study, it is clear that in this study, statements 7 (“The most common treatment for glaucoma is surgery”) and 18 (“Fluorescent lights will make glaucoma worse”) of the questionnaire were the ones that had statistical

significance, when compared in relation to the percentage of correct answers of the groups. Although the statements 2.6 and 10 were not statistically significant, there was a tendency to difference. In the study by Danesh-Meyer et. al[17], in addition to statements 7 and 18, thirteen others (2, 3, 4, 5, 6, 8, 9, 10, 14, 16, 17, 21 and 22) were also statistically significant when comparing the percentage of correct answers between the control group and patients with established glaucoma. This difference may be attributed to the larger sample size of the study, the country where it was performed, and the samples of the groups being obtained in different locations, such as private clinics.

In several studies, it was observed that the low level of knowledge about glaucoma is related to worse therapeutic adherence. Other factors were also correlated with low adherence to treatment, such as socioeconomic conditions, difficulty in applying eye drops, absence of improvement in visual acuity and side effects (Cintra et al., 1998; Friedman et al., 2008; MacKean & Elkington, 1983; Norell, 1979; Spaeth, 1970).

In the study by Costa et.al. (Costa et al., 2006) , four possible factors of lack of knowledge in the two populations with glaucoma evaluated in the study were listed: the fragile doctor-patient relationship; the little concern of the patient in relation to their health; the lack of information given to patients and the way in which such information is provided.

In the studies by Kim et. Al. (Kim et al., 1997) and Rosenthal et. al. (Rosenthal, Zimmerman, & Tanner, 1983), videos were used to promote knowledge about glaucoma. Improvement was observed in both within one week, but after a few months the level of knowledge was not maintained. These facts demonstrate that the provision of information in a single moment is insufficient, so it is necessary to maintain access to information continuously to these patients, given the incidence of glaucoma in society.

This necessity reinforces the role of the ophthalmologist in creating a good doctor-patient relationship in order to better guide patients on the prevention and treatment for glaucoma and inform them about the disease. In addition, the present study showed that even with technological innovations and greater access of society to means of information, patients remain uninformed about glaucoma, reiterating the role of the ophthalmologist in promoting ocular health.

In the analysis of the knowledge of the treatment, it is noted that only one third of the patients, glaucomatous or not, thought that the eye drops for glaucoma did not cause systemic side effects, 41 patients with glaucoma believed that they would have symptoms that would warn them to the progression of the diseases. These observations were also noted in the study by Danesh-Meyer et.al. (Danesh-Meyer et al., 2008).

Limitations of this study include the small number of patients, the restriction of a single location to obtain the sample and the age group of patients in the group without glaucoma being mostly older than 55 years. Conducting a multicenter study with a larger number of patients in public and private services, as well as obtaining a control group with better distributed age groups, can provide an understanding of the level of knowledge of the population with glaucoma and without the disease.

In fact, it is necessary to create a continuous and effective method of information and evaluation of the knowledge about glaucoma, in order to provide solid and quality information to society regarding glaucoma, its treatment and prevention.

Conclusion

Patients with glaucoma know more about the disease than patients without glaucoma, but seem unaware of the aggravations of this disease. This study emphasizes the importance of the ophthalmologist in the guidance and promotion of ocular health and suggests the need to improve the knowledge of the population about glaucoma and the prevention of blindness through the provision of information in a continuous and effective way.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All data are included in the content of the paper.

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Declaration for Human Participants: This research study was approved by Research Ethics Committee of the Centro Universitário FMABC (protocol: 4.427.013). All volunteer subjects were informed about the study and invited to participate after signing the Free and Informed Consent Form.

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