

Patients' compliance to clinical treatment that benefit from the Brazilian National Glaucoma Program

Adesão ao tratamento clínico em pacientes beneficiados pelo Programa Nacional do Glaucoma

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ABSTRACT

Objective: To evaluate the adherence to clinical glaucoma treatment in patients that benefit from the Brazilian National Glaucoma Program and receive antiglaucomatous eye drops free of charge. **Methods:** This cross-sectional study included 255 patients that benefit from the Brazilian National Glaucoma Program (BNGP) and were assisted at the Altino Ventura Foundation (FAV), Pernambuco state, Brazil. The Morisky's Adhesion Scale (MAS) was used to evaluate adhesion profile to treatment. Patients with a Morisky's Adhesion score ≥ 6 was considered adherent to treatment. The analyzed variables included sex, educational level, distance from home to the treatment center, number of eye drops used, time since the glaucoma diagnosis, patients' subjective classification of their quality of vision, and prevalence of other comorbidities. **Results:** A total of 255 patients [167 (65.4%) females] were included in this study with a mean age was 65.9 ± 13.8 years (range, 11-99 years). Adherence to clinical glaucoma treatment was seen in 155 patients (60.8%). Worse adherence to treatment was observed in female patients ($p=0.034$), with low education level ($p=0.046$), who presented other comorbidities ($p=0.048$), living in remote areas ($p=0.038$), judged their vision as satisfactory ($p=0.046$), and who were recently diagnosed with glaucoma ($p=0.001$). **Conclusion:** 40% of patients who benefited from the Brazilian National Glaucoma Program were not compliant to treatment. Low adhesion rate was mostly seen in female patients, socially vulnerable, living in remote areas, recently diagnosed with glaucoma, using fewer eyedrops, presenting other comorbidities, and in those that considering themselves of having a satisfactory vision.

Keywords: Intraocular pressure; Glaucoma; Blindness; Patient compliance; Adherence to treatment

RESUMO

Objetivo: Avaliar a adesão ao tratamento clínico do glaucoma em uma população que recebe colírios antiglaucomatosos gratuitamente pelo Programa Nacional do Glaucoma (PNG). **Métodos:** Estudo transversal que incluiu 255 pacientes inscritos no PNG e acompanhados na Fundação Altino Ventura, Recife, Pernambuco, Brasil. A Escala de Adesão de Morisky (EAM) foi usada para avaliar a adesão ao tratamento. Pacientes que pontuavam ≥ 6 na EAM eram considerados aderentes ao tratamento. As variáveis analisadas incluíram: gênero, escolaridade, distância entre a moradia e o centro de referência, número de colírios utilizados, tempo de diagnóstico de glaucoma, qualidade subjetiva da visão e prevalência de doenças sistêmicas associadas. **Resultados:** Total de 255 pacientes [167 (65,4%) mulheres] foram incluídos no estudo, com média de idade dos participantes de $65,9 \pm 13,8$ anos (variação, 11-99 anos). A adesão ao tratamento clínico do glaucoma foi encontrada em 155 pacientes (60,8%). Pior adesão foi identificada em pacientes do sexo feminino ($p=0,034$), com baixa escolaridade ($p=0,046$), com outras comorbidades ($p=0,048$), que moravam longe do centro de tratamento ($p=0,038$), apresentavam boa qualidade de visão subjetiva ($p=0,046$) e apresentavam diagnóstico recente de glaucoma ($p=0,001$). **Conclusão:** Quarenta por cento (40%) dos pacientes beneficiados do PNG não estão aderentes ao tratamento. A baixa taxa de adesão foi associada a pacientes do sexo feminino, com baixa escolaridade, vivendo longe do centro de tratamento, com diagnóstico recente de glaucoma, em uso de poucos colírios antiglaucomatosos e que apresentavam comorbidades.

Descritores: Hipertensão Ocular; Glaucoma; Cegueira; Cooperação do paciente; Adesão ao tratamento

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INTRODUCTION

Glaucoma is a neurodegenerative disease characterized by a progressive injury to the nerve fiber layer that causes substantial visual field loss.^(1,2) Glaucoma is still considered the second leading cause of blindness in the world and it is widely discussed due to its chronic and silent course.⁽³⁻⁸⁾

Among the several risk factors for glaucoma including ethnicity, gender, comorbidities and intraocular pressure (IOP), the IOP is the sole risk factor that can be controlled with therapy.^(9,10) A wide variety of treatment modalities including clinical treatments and surgical procedures are available for lowering the IOP⁽¹⁰⁻¹⁵⁾. The antiglaucomatous eyedrops are commonly the first choice of therapy adopted in patients with primary open-angle glaucoma since it can reduce aqueous humor production or increase its drainage by the trabecular meshwork.^(15,16) However, the success of this therapy is directly related to patient's compliance to treatment.

Studies have shown that compliance to treatment can be challenging in glaucoma patients since it requires chronic use and in many cases, more than one different antiglaucomatous eyedrop is needed to reach the IOP goal.^(17,18) In addition, the cost of the eyedrops have been identified as the main reason for patients to dropout of treatment, especially low-income patients.^(19,20)

When taken in consideration the estimated cost involved in the rehabilitation of a blind patient versus the estimated cost involved in blindness prevention, studies have shown that the investment in prevention is much lower and therefore, the public health strategies have been increasingly applied to prevention lately.⁽²⁰⁻²²⁾ In Brazil, the Ministry of Health developed the Brazilian National Glaucoma Program in 2013 to provide free eyedrop treatment for low-income glaucoma patients.⁽¹³⁾ Although patients can register in the Brazilian National Glaucoma Program and receive monthly their eyedrops free of charge, to our knowledge, there is no information on whether these patients are compliant to the glaucoma treatment. Thus, in this study we investigated patients' compliance to clinical treatment that benefited from the Brazilian National Glaucoma Program.

METHODS

A cross-sectional study was conducted at the Altino Ventura Foundation, Pernambuco state, Brazil. The study included patients of all ages, sexes, and races that benefited from the Brazilian National Glaucoma Program of the Brazilian Ministry of Health and were assisted at the FAV.

This research was approved by the FAV institutional review board (protocol n° 2.338.153). Patients in agreement to participate provided a writing consent prior to enrollment.

A questionnaire was applied to all participants between October 2017 and April 2018 to investigate patients' compliance to glaucoma clinical treatment and their sociodemographic profile. The questionnaire was composed of three sections. The first section included the patients' sociodemographic information, educational level, distance from their home to FAV, and a self-evaluation of their quality of vision. The educational level of patients was classified as low when secondary school was not concluded. The self-evaluation of the quality of vision was judged by the patient as bad, reasonable or good. The second section of the questionnaire addressed the number of eyedrops the patient was using, time since the patient received the diagnosis of glaucoma, and diagnosis of other comorbidities such as systemic

arterial hypertension and diabetes. The third section comprised the Morisky Medication Adherence Scale - 8 (MMAS-8), which has been validated in Portuguese and consists of 8 questions that evaluate the patients' compliance to treatment. Patients that scored 6 or more points classified as compliant to treatment.⁽²³⁾

Statistical analysis was performed using the software Statistical Package for the Social Sciences (SPSS) version 25.0 (SPSS Inc., Chicago, IL, USA). The data were analyzed and compared using descriptive statistical measures. Continuous variables were expressed as mean \pm standard deviation (SD) and range. Categorical variables were expressed as absolute and relative frequencies. MMAS-8 results were compared with the sociodemographic variables. Chi-square test was used to verify the association between categorical variables and, $p < 0.05$ was considered statistically significant.

RESULTS

A total of 255 glaucoma patients (65.4% females) were included in this study with a mean age at participation of 65.9 ± 13.8 years (range, 11-99 years). One hundred and ninety-one (74.9%) patients lived in Recife or the metropolitan area, Pernambuco state, Brazil. The patients' educational level was classified as low in 186 (72.9%) of patients. A total of 167 (65.5%) patients presented systemic arterial hypertension and/ or diabetes mellitus.

The mean number of eyedrops per patient was 2.7 ± 0.96 (range, 1 - 4) and 168 (65.8%) patients had been diagnosed with glaucoma for more than 5 years. With regards the quality of patients' vision, 54 (21.2%) patients judged their vision as good, 107 (42.0%) as reasonable, and 90 (35.3%) as poor.

Compliance to treatment was identified in 155 (60.8%) of the glaucoma patients based on the MMAS-8 score. Patients recently diagnosed with glaucoma (less than five years) comprised only 34.1% of the study sample but corresponded to 63.3% of the individuals who interrupted their glaucoma treatment and justified it by not feeling any better with treatment or due to discomfort ($p = 0.001$). Illiterate patients represented 50% of the individuals who decided on their own to interrupt treatment ($p = 0.046$). Patients who judged their vision as good and those who used fewer eyedrops presented worse adhesion to clinical treatment ($p = 0.046$ and $p = 0.099$, respectively).

Table 1 compares the compliant patients versus non-compliant patients based on their sociodemographic and glaucoma profiles.

When asked about how often they forgot to instill their glaucoma eyedrops, 129 (50.6%) answered never, 67 (26.3%) rarely, 52 (20.4%) sometimes, six (2.4%) often, and one (0.4%) always. A sub analysis of the patients that informed that they forgot sporadically to instill their glaucoma eyedrops revealed that 82 (72.5%) were women ($p = 0.034$) (Table 2). In addition, patients that lived in remote areas were the ones who forgot to use their glaucoma eyedrops in the last 2 weeks ($p = 0.038$), as showed in table 3.

With regards to feeling remorse for not using their eyedrops, female patients and those with other comorbidities (arterial hypertension or diabetes) were the ones who felt the remorse the most ($p = 0.042$ and 0.048 , respectively) (Table 4).

DISCUSSION

Glaucoma is a silent disease and the absence of symptoms in its initial phases contributes to a higher rate of skipping

Table 1
Sociodemographic and glaucoma profiles of BNGP patients

Feature		Compliant n=155 (60.8%)	Non-compliant n=100 (39.2%)
Sex		n(%)	n(%)
	Male	63 (40.6)	25 (25.0)
	Female	92 (59.3)	75 (75.0)
Education	Illiterate	13 (8.3)	15 (15.0)
	Incomplete elementary school	78 (50.3)	45 (45.0)
	Complete elementary school	23 (14.8)	12 (12.0)
	Incomplete high school	8 (5.1)	4 (4.0)
	Complete high school	25 (16.1)	19 (19.0)
	Incomplete college/university education	1 (0.6)	1 (1.0)
	Complete college/university education	7 (4.5)	4 (4.0)
Glaucoma diagnosis time	Up to 1 year	8 (5.1)	3 (3.0)
	Between 1-3 years	25 (16.1)	12 (12.0)
	Between 3-5 years	18 (11.6)	21 (21.0)
	Greater than 5 years	104 (67.0)	64 (64.0)
Number of eye drops	1	21 (13.5)	12 (12.0)
	2	47 (30.3)	26 (26.0)
	3	50 (32.2)	41 (41.0)
	4 or more	37 (23.8)	21 (21.0)

Table 2
Analysis of patients that forgot sporadically to use their glaucoma eyedrops

Variables	Forgot sometimes to instill the glaucoma eyedrops		p-value*
	Yes n(%)	No n(%)	
Sex			0.034
Female	82 (72.5)	85 (59.8)	
Male	31 (27.5)	57 (41.2)	
Residence			0.207
Recife region	86 (76.1)	107 (75.3)	
Remote area	27 (23.9)	35 (24.7)	
Glaucoma treatment time			0.355
< 1 year	2 (0.01)	9 (6.3)	
1-3 years	17 (15.0)	20 (14.0)	
3- 5 years	17 (15.0)	22 (15.4)	
> 5 years	77 (70.0)	91 (64.0)	
Education			0.392
Illiterate	15 (13.2)	13 (9.1)	
Others	98 (86.8)	129 (90.9)	
Comorbidities			0.254
Hypertension and/or diabetes	78 (69.0)	89 (62.6)	
None	35 (31.0)	53 (37.4)	

*Chi-square test

Table 3
Sub analysis of patients who skipped medication in the last 2 weeks

Variables	Skipped eye drops in the last 2 weeks		p-value*
	Yes n(%)	No n(%)	
Sex			0.030
Female	40 (78.4)	127 (62.2)	
Male	11 (21.6)	77 (37.8)	
Residence			0.038
Recife Region	34 (66.6)	157 (76.9)	
Remote Area	17 (33.4)	47 (23.1)	
Glaucoma treatment time			0.641
< 1 year	3 (5.8)	8 (3.9)	
1-3 years	8 (15.6)	29 (14.2)	
3- 5 years	10 (19.6)	29 (14.2)	
> 5 years	30 (58.8)	138 (67.6)	
Education			0.513
Illiterate	9 (17.6)	19 (9.3)	
Others	42 (82.4)	195 (90.7)	
Comorbidities			0.160
Hypertension and/or diabetes	36 (70.5)	131 (64.2)	
None	15 (29.5)	73 (35.8)	

*Chi-square test

Table 4
Sub analysis of patients that felt remorse
when forgot to use their glaucoma eyedrops

Variables	Felt remorse after forgetting to use eyedrops		p-value*
	Yes n(%)	No n(%)	
Sex			
Female	50 (75.7)	117 (61.9)	0.042
Male	16 (24.3)	72 (38.1)	
Residence			
Recife Region	51 (77.2)	140 (74.0)	0.713
Remote Area	15 (22.8)	49 (26.0)	
Glaucoma treatment time			
< 1 year	2 (3.0)	9 (4.7)	0.342
1-3 years	6 (9.1)	31 (16.4)	
3- 5 years	13 (19.6)	45 (68.1)	
> 5 years	26 (13.7)	123 (65.0)	
Education			
Illiterate	8 (12.1)	20 (10.5)	0.901
Others	58 (87.9)	169 (89.5)	
Comorbidities			
Hypertension or diabetes	39 (59.0)	128 (67.7)	0.048
None	27 (41.0)	61 (32.3)	

*Chi-square test

episodes and makes it more challenging to doctors to explain the importance of treatment. In addition, other variables such as patients socioeconomical profile may play an important role in how patients comply to treatment. Therefore, the Brazilian National Glaucoma Program was created with the purpose of subsidizing glaucoma treatment through the Brazilian Public Health System to patients that cannot afford buying the glaucoma eyedrops, and therefore, increase patients' compliance to clinical treatment. However, the present study identified that 39.2% of patients are not compliant to treatment despite receiving the treatment free of charge.

In general, patients' adhesion to the antiglaucomatous eyedrops treatment varies in the literature from 30% to 80%.^(20,25,26) Similarly, the patients in our study that benefited from the Brazilian National Glaucoma Program and received their glaucoma eye drops with no cost presented an adhesion rate of 60.8%.

In the current study, important factors were identified that may influence patients' compliance to the Brazilian National Glaucoma Program. In agreement with Vilela de Castro et al.⁽²⁷⁾, our results also showed that patients in use of less eyedrops and those that considered themselves having good vision were ones with the lowest adhesion rate. Other important risk factors that have also been identified in previous studies include patients' low educational and socioeconomic levels.^(1,8,28) All of these factors are intrinsically related and suggest that the lack of information on the progression of their disease and the irreversible component of glaucoma blindness can lead to patients' bad adhesion to treatment.

Another factor identified that affects how patients comply was how far patients were from the treatment center. In order

to receive their eyedrops free of charge, patients need to return to the treatment center for follow-up. As previously identified, patients living far away from the treatment center depend on public transportation and often stops the medication in use due to limited access to the medication.⁽²⁹⁾

Although our study identified that patients with other systemic comorbidities were less compliant to treatment, this finding differs from other authors.^(1,23) We hypothesize that glaucoma patients that have other comorbidities have to manage additional medications (systemic and ocular) and can forget to use their glaucoma eyedrops. In fact, patients with a recent diagnosis of glaucoma were found to be less compliant to treatment. This situation may be attributed to the lack of routine associated with a lack of awareness, which is essential to generate motivation and adherence to treatment.⁽²⁴⁾

The limitations of this study include the subjectivity of the questions and having to rely on patients' memory. However, we were able to identify herein the most vulnerable glaucoma patients and therefore, want to bring awareness to physicians and authorities about the need to specifically address this population. Low-income and less educated patients require more attention and need more explanation about their disease in order to become more compliant to treatment. Therefore, physicians must take more time to explain to patients the irreversibility of the condition and the need for regular use of anti-glaucomatous eye drops, taking into account the vulnerable patients identified in this study. Moreover, in order to increase adherence to treatment and provide better healthcare to patients, the promotion of glaucoma awareness needs to be adapted to patients' understanding, especially for the vulnerable population herein identified.

CONCLUSION

Considerable number of the glaucoma patients that belong to the Brazilian National Glaucoma Program are not compliant to treatment regardless of receiving their eyedrops for free. The less compliant patients were females, with low educational level, socially vulnerable, living in remote areas, diagnosed with glaucoma in the past 5 years, presenting other comorbidities, using fewer eyedrops, and in those that considered themselves of having a satisfactory vision.

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