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Therapeutic Adherence in Patients with Chronic Simple Glaucoma

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Abstract: Introduction: Chronic simple glaucoma is one of the leading causes of blindness and visual impairment worldwide and requires ongoing treatment. Therefore, therapeutic adherence is the safest way to control it. Objectives: To determine the level of treatment adherence in patients with chronic simple glaucoma. Methodology: An observational, descriptive, and cross-sectional study was conducted in 44 patients with primary open-angle glaucoma who were seen in the glaucoma clinic of the Bechar Ophthalmological Establishment in Algeria between September and December 2024. Data were obtained through interviews with each patient. The variables analyzed were: age, sex, educational level, prescribed treatment, level of treatment adherence, and reasons for non-adherence. The Morisky-Green-Levine test was used as a measurement instrument. Results: Males and the 60-79 age group were predominant. The most commonly prescribed pharmacological group was prostaglandin analogues. 52.3% of patients used more than one glaucoma medication. Furthermore, 59.1% of patients had poor treatment adherence, with forgetfulness, financial problems, and discomfort caused by the medication being the underlying causes. Conclusion: Treatment adherence in patients with chronic simple glaucoma is low, which exposes them to disease progression, with its associated impact on the individual, family, and society.

Key words: glaucoma; chronic; treatment; compliance; adherence

1. Introduction

Vision is the most dominant of our senses, playing a fundamental role in every facet and stage of our lives. It is estimated to be responsible for 80% of the sensations we perceive, allowing humans to perform a series of vital functions such as orientation, movement, information acquisition, and interaction with their environment and its constituent elements. Considering this, the first and most noble responsibility of the ophthalmologist is the detection and successful management of pathological conditions that threaten the integrity of visual function, with glaucoma being one of its most feared enemies. [1, 2]

Glaucoma is defined as a chronic optic neuropathy, characterized by a sustained increase in intraocular pressure (IOP)

and damage to nerve fibers , resulting in visual field loss. There are several types, but the most common is primary open-angle glaucoma, which accounts for two-thirds of all cases and is a public health problem worldwide, as symptoms appear in very advanced stages of the disease, which can cause blindness and irreversible anatomical damage. [2, 3]

Glaucoma remains a devastating disease, classified among the leading causes of low vision and visual loss, which can be total. Despite significant advances in medical and surgical treatments, this disease, affecting approximately 1% of the global adult population, is associated with an underreporting rate of 56-75%. In both developed and underdeveloped countries, including those with the best health indices, nearly 50% of cases remain undiagnosed. This underscores the importance of regularly screening people over 60 years of age, among whom the prevalence is seven times higher. [2, 4, 5, 6]

According to estimates by the World Health Organization, there are approximately 79.6 million blind people worldwide due to this disease; this figure will increase by 1 to 2 million each year, so the number of those affected between the ages of 40 and 80 is expected to reach 11.8 million by 2040. Risk factors associated with glaucoma include age, with an incidence of 1.5% in the general population and a progressive increase in those over 40 years of age, as well as skin color, since people with skin other than white have a 4 times greater risk of suffering from it. [1, 5, 7, 8]

The main objective of glaucoma treatment is to preserve visual function by lowering IOP, since its reduction delays or halts the progression of this disease in cases of ocular hypertension (OHT), and even normal pressure glaucoma; the prognosis improves with lower IOP. IOP reduction can be achieved in most cases through the administration of topical medications (eye drops), while surgery and laser treatment are usually reserved for refractory cases. [2, 3, 4]

One of the major problems with this chronic disease is the lack of adherence to drug treatment. This reality means that many patients fail to achieve good control of eye pressure and increase the risk of blindness, greatly impairing their quality of life. [4, 9]

The World Health Organization (WHO) defines therapeutic adherence as "the degree to which a person's behavior in taking medication, following a diet, and implementing lifestyle changes corresponds to the recommendations agreed upon with a healthcare provider." [9]

Therapeutic adherence is a complex process that requires certain factors: factors related to the patient, the professional, the healthcare system, the disease, and the drugs themselves. [9, 10]

Measuring and evaluating therapeutic adherence is necessary, allowing for the planning of effective, efficient, and high-quality treatments. Although non-adherence is a common practice, it is rarely detected by healthcare professionals. Studies are needed to estimate the levels of non-adherence in patients with glaucoma. [9, 11]

This lack of therapeutic adherence should be considered a serious public health problem given its high prevalence, its direct relationship with a worse progression of the disease, and the increased risk of blindness. All of this impacts the reduction of patient quality of life and the resulting economic impact on the healthcare system.

This is the reason for this study, given the high prevalence of the disease and the lack of adherence to treatment, which represents a health problem and leads to complications for the patient. Therefore, this research aims to determine the level of treatment adherence in patients with chronic simple glaucoma.

2. Method

An observational, descriptive, and cross-sectional study was conducted in 44 patients with primary open-angle glaucoma who were seen in the glaucoma clinic of the Bechar Ophthalmological Establishment in Algeria between September and December 2024. Data were obtained through interviews with each patient. The variables analyzed were: age, sex, educational level, prescribed treatment, level of treatment adherence, and reasons for non-adherence. The

Morisky-Green-Levine Self-Reported Adherence Test was used as the measurement instrument. This is an indirect measurement method based on a voluntary patient interview. It consists of a four-question questionnaire designed to determine the presence or absence of treatment adherence.

The statistical processing of the data was performed using SPSS for Windows version 11.0, using descriptive statistics, and the percentage was used as the summary measure. Bioethical principles were upheld, in accordance with the regulations in force for this type of study. Written informed consent was obtained from each participant, respecting the confidentiality requirements.

3. Results

40.9% of the patients studied adhered to blood pressure-lowering treatment, and 22.7% of therapeutic adherence was represented by the 60-79 age group (Table 1).

Table 1. Therapeutic adherence by age group

Age	Adherence to treatment				Total	
	Yes		No		Nº.	%**
	Nº	%*	Nº.	%*		
< 40	3	6.8	-	-	3	6.8
40-59	5	11.4	7	15.9	12	27.3
60-79	10	22.7	14	31.8	24	54.5
≥ 80	-	-	5	11.4	5	11.4
Total	18	40.9	26	59.1	44	100.0

The male gender predominated, accounting for 59.1%. Therapeutic adherence was more common among women, at 22.7%. (Table 2).

Table 2. Therapeutic adherence by sex

Sex	Adherence to treatment				Total	
	Yes		No		No	%**
	No	%*	No	%*		
Male	8	18.2	18	40.9	26	59.1
Female	10	22.7	8	18.2	18	40.9
Total	18	40.9	26	59.1	44	100.0

Of the patients who adhered to treatment, 15.9% were in the upper secondary education group, while 25% of the patients who did not adhere to treatment were in secondary education (Table 3).

Table 3. Treatment adherence by educational level

Level of education	Adherence to treatment				Total	
	Yes		No		No	%**
	No	%*	No	%*		
No education	2	4.5	5	11.4	7	15.9
Primary	-	-	3	6.8	3	6.8
Secondary	4	9.1	11	25.0	15	34.1
High school	7	15.9	5	11.4	12	27.3
University	5	11.4	2	4.5	7	13.6
Total	18	40.9	26	59.1	44	100.0

It was observed that 15.9% of patients with less than 5 years of disease progression had therapeutic adherence (Table 4).

Table 4. Therapeutic adherence according to disease progression time

Evolution time	Adherence to treatment				Total	
	Yes		No		No	%**
	No	%*	No	%*		
Less than 5 years	7	15.9	5	11.4	12	27.3
5-10 years	6	13.6	14	31.8	20	45.4
more than 10 years	5	11.4	7	15.9	12	27.3
Total	18	40.9	26	59.1	44	100

Table 5. Therapeutic adherence according to quantity of medications

Quantity of medications	Adherence to treatment				Total	
	Yes		No		No	%**
	No	%*	No	%*		
1 drug	8	18.2	3	6.8	11	25
2 drugs	6	13.6	9	20.5	15	34.1
3 drugs	4	9.1	14	31.8	18	40.9
Total	18	40.9	26	59.1	44	100

Table 6. Medications used for glaucoma

Drugs	Adherence to treatment				Total	
	Yes		No		No	%**
	No	%*	No	%*		
Prostaglandin analogues	7	15.9	1	2.3	8	18.2
Beta-blockers	1	2.3	-	-	1	2.3
Carbonic anhydrase inhibitors	-	-	2	4.5	2	4.5
Beta-blockers + Inhibitors	3	6.8	5	11.4	8	18.2
Analogues + Beta-blockers	2	4.5	1	2.3	3	6.8
Analogues + Inhibitors	1	2.3	3	6.8	4	9.1
Analogues + Beta-blockers + Inhibitors	4	9.1	14	31.8	18	40.9
Total	18	40.9	26	59.1	44	100

Among the reasons for treatment non-adherence, forgetfulness was the most common, accounting for 40.9%, followed by high medication cost (27.3%), and discomfort caused by medications (22.7%) (Table 7).

Table 7. Reasons for treatment non-adherence

Causes of noncompliance	No	%
Forgetfulness	18	40.9
They are costly	12	27.3
Inconvenience	10	22.7
Dependence on another person	8	18.1
No improvement in vision	7	15.9
Lack of time	5	12.2

4. Discussion

Glaucoma is a chronic disease that does not manifest until very advanced stages. Many patients may believe that drug treatment is not important, which makes it difficult to implement, as is also the case with high blood pressure. Glaucoma treatment is primarily based on reducing intraocular pressure, with adherence to treatment being a key factor in preventing accelerated disease progression. Furthermore, the progression of the disease over time determines the degree of therapeutic adherence, and this decreases in chronic diseases, such as glaucoma, as the patient experiences fatigue and forgets to administer medications. [13, 14]

In the literature reviewed on therapeutic adherence, a study conducted in a pharmacy in Spain presents the results of the Morisky-Green-Levine test, showing that 50.0% adhered to pharmacological treatment. We also found a study conducted at Matini Hospital in Iran that found an adherence rate of approximately 34%. This figure is relatively similar to the 40.9% adherence rate found in our study. Similar results were also evident in the study conducted in 2005 in Nigeria where only 43.9% adhered to the treatment. [11, 15, 16] On the other hand, these results differ from those found in the study conducted at the University of Alabama in Birmingham, which showed that 80% of the population adhered to antiglaucoma treatment and by Williams Rivas who found that 72.4% of his patients adhered to the treatment. [17, 18]

Regarding adherence by age group, the highest therapeutic adherence was found in the 60-79 age group, accounting for 22.7% of the total. Results were similar to those found by Barris Blundell D., who found that those aged 70 to 79 answered all four test questions correctly. [11] Some authors have found that older patients are less likely to forget to take their medications because these patients often also suffer from other conditions and have more symptoms, which encourages them not to stop taking their medication. However, one study concluded that older patients are more likely to fail to adhere to their treatment because they more frequently forget to take their medications due to the memory loss that often accompanies aging. There is no statistically significant association between adherence to antiglaucoma treatment and age. [18]

According to a WHO report, age is a factor that influences treatment adherence, but inconsistently. Other sources, meanwhile, attribute a fundamental role to age in treatment adherence. As age increases, there is a greater risk of noncompliance with medical guidelines, related to the presence of multiple chronic diseases in the elderly, which require complex and prolonged treatment. Furthermore, they are the largest consumers of prescription medications. [19]

The results of this research coincide with the work of Barris Blundell D, who observed greater adherence in women than in men. It has been suggested that women are more systematic in following medical instructions. [11] However, studies that relate sex and treatment adherence do not always show concordant results. Some authors state that there is no relationship between adherence and female sex, and others report that the most compliant sex is male. [20] The results found in the study in favor of females may be due to the fact that women, despite attending glaucoma consultations in smaller numbers, are more responsible in following instructions.

The research found that the majority of patients who adhere to treatment correspond to the upper secondary technical group, followed by the university group. Most reports agree with these findings, but others conclude that there is no significant relationship between educational level and treatment adherence. Patients with higher education and greater general education are considered to be more compliant with treatment because they have a more realistic perception of the long-term risk of uncontrolled hypertension. [11, 15, 16]

At the time of this study, the disease duration was less than 5 years in most patients who were adherent to treatment. These results were consistent with those reported in series from different latitudes, which suggest that good adherence during the first two years of the disease reflects adherence patterns in subsequent years. [21, 22]

It was observed that monotherapy had greater therapeutic adherence than combination therapy. The modalities of the therapeutic regimen influence adherence. Patients taking a single medication, also administered in a single daily dose, had a much higher adherence rate than those on a two- or three-drug regimen. It is expected that the more drops, the greater the patient's risk of forgetting to take their medication; however, factors such as discouragement or boredom resulting from having to deal with complex medication schedules may also influence this. Several authors affirm that multiple medications promote noncompliance, reporting similarity with the results obtained with monotherapy. [11, 16, 21]

Regarding the medications used to control IOP included in the study, we can highlight that the most commonly used pharmacological group was prostaglandin analogues, with 18.2% as monotherapy and 56.8% as combination therapy. This figure means that 75% of respondents use prostaglandin analogues to control IOP. Followed by carbonic anhydrase inhibitors at 72.7% and blockers at 70.5%. These results are consistent with those found in other studies [11, 18] and also differ from those found in the study conducted in Nigeria, where the most prescribed medications were carbonic anhydrase inhibitors. [16]

In the present study, the most common cause of treatment noncompliance was forgetfulness, followed by medication cost. Monterrey M. also suggests that the main reason for forgetfulness is the quantity of medications some patients take. Another factor that hinders adherence is the presence of undesirable medication effects. Our results differ from those found in the Nigerian study, where the main causes of noncompliance were adverse effects (36.6%), medication shortages (22%), and high medication costs (12.2%). [16]

The level of therapeutic adherence among patients with chronic simple glaucoma at the Bechar Ophthalmology Center is low, which exposes them to disease progression, with the resulting repercussions for the individual, family, and society.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Authors' Contribution

Yargelis González Orza: Participated in the analysis, collection, and interpretation of results, methodology, project administration and design, supervision, validation, visualization, and drafting of the work. Approved the final version of

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Yaima Hodelin Romero: Participated in the analysis, collection, and interpretation of results. Approved the final version of the document. (15%)

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Idael Sánchez Hechavarria: Participated in the design and drafting of the work. Formal analysis, research, and methodology. Approved the final version of the document. (15%)

Tania Yelina Silva Chil: Participated in the design and drafting of the work. Project administration, resources, and software. Approved the final version of the document. (15%)