

Compliance with Medical Treatment in Primary Open-Angle Glaucoma (POAG) at the Centre for the Application of the Diploma of Specialized Studies in Ophthalmology (CADES/O)

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Abstract

Introduction: Primary open-angle glaucoma, a chronic, potentially blinding disease, requires lifelong medical treatment that demands full patient compliance. The objective was to determine the rate of compliance and to study the determinants of compliance in glaucoma patients followed at CADES/O. **Patients and Methods:** This was an observational study, which included old and new glaucoma patients. Compliance was assessed on the availability of medication, regularity of dosing schedules, compliance with prescribed doses, and regularity at check-ups. Compliance was judged to be good when at least four (4) of these criteria were met, fair when only three (3) of these criteria were met and poor when only two (2) of these criteria were met. **Results:** Compliance was considered good in 38.4% of cases, fair in 48.2% of cases and poor in 13.4% of cases with an overall compliance rate of 86.6%. The correlation was not statistically significant for age, sex, origin, length of illness, route of administration, instiller, or therapeutic regime. On the other hand, profession, level of education, presence of systemic arterial hypertension, compliance with instillation schedules, prescribed dosage, regularity of treatment, compliance with control visits and the climate of trust between patient and treating physician were the determining factors with the greatest statistical influence on compliance with treatment. **Conclusion:** Compliance with glaucoma treatment is linked to the patient factor but especially to the doctor factor. Doctors should take their time to explain to patients their disease, its evolution with or without treatment and above all the necessity of a good therapeutic compliance.

Keywords

Compliance-Medical Treatment-POAG-CADES/O

1. Introduction

Primary open-angle glaucoma (POAG) is a chronic and potential blinding eye condition. It requires lifelong medical treatment with full patient compliance. In our context, daily instillation of antihypertensive eye drops at regular times and for life is the first therapeutic intention, which can be very restrictive for patients and by far, benefit from their full cooperation, especially when the disease is in the asymptomatic stage. However, the success of treatment in controlling the progression of glaucoma will depend largely on compliance, which is a key of successful management. Adherence has been defined as the patient's compliance with the physician's prescriptions and recommendations, which includes forgetting and dropping treatment, incorrect timing or spacing, ineffective or excessive instillations, self-medication and failure to attend follow-up visits [1] [2]. In addition to these, the present series also looked at accessibility to the treatment centre. Most publications have found that glaucoma patients are very poor adherents [3]. Some studies have estimated that 10% of visual field losses are secondary to poor compliance [2]. The rate of glaucoma patients with good compliance varies according to the studies from 40% to 73% [3]. Compliance with medical treatment for glaucoma has received little attention in sub-Saharan African. Tchabi *et al.* [4] estimated the compliance rate at 53.3% in Cotonou. Compliance was judged to be good in 10.3% of cases, average in 65.4% of cases and poor in 24.3% of cases in the study by Santos *et al.* [2] in Togo. To our knowledge, the present work is the very first in Guinea. The objective was to determine the rate of therapeutic compliance and to study the determinants of compliance in glaucoma patients followed at CADES/O.

2. Patients and Methods

This was an observational study, running from April 1, 2020 to September 30, 2020 at CADES/O, National Hospital of Donka in Conakry, on patients being monitored for chronic glaucoma who were on a medical treatment regimen. Recruitment was exhaustive of all glaucoma patients on anti-glaucoma medication alone, the only selection criterion. The patients' exclusion criterion was to lost to follow-up or to change the regimen of treatment such as selective laser trabeculoplasty (SLT) or surgery. All patients were considered including those with previous glaucoma and those with naive eyes. An eye was considered naive when it had never received antihypertensive treatment. Study variables were age, sex, occupation, distance from home, education level, length of disease, accessibility of medication, financial support for treatment, strategy, treatment schedules and doses, frequency of product use, regularity of check-ups, and doctor-patient re-

relationship. Compliance was assessed on the basis of the availability of medicines, regularity of intake times, compliance with prescribed doses, and regularity of check-ups. Compliance was judged to be good when at least four (4) of these criteria were met, fair when only three (3) of these criteria were met, and poor when only two (2) of these criteria were met. Participants were seen at follow-up at M1, M3 and M6 (M means month). Control was considered good when the patient met at least all three controls. This control examination was to include measurement of corrected visual acuity, intraocular pressure (IOP) by an i-care 100 tonometer, fundus to determine papillary excavation and visual field study, done at the first and last control, in the interest of assessing disease stability. The mean IOP of the patients was calculated only to determine the influence of compliance on blood pressure normalisation. Data were collected from a structured questionnaire at each control exploring the different determinants of compliance. Epi 7 software was used, Chi 2 or Fisher statistical tests were applied for significance analysis at the p-value threshold of 0.05.

Prior to any administration of the questionnaire, the patients were extensively informed, in order to obtain free and informed consent. A code number was assigned to each patient. We reassured them that anonymity would be respected in the reporting of the data and took care to inform them that they could withdraw from the study at any time without constraint. The results were reported in a confidential manner. The study was approved by the ethics committee of the ophthalmology chair of the Faculty of Health Sciences and Technology of the University of Conakry. The study adhered strictly to the declaration of ethical principles of the 67th General Assembly of the World Medical Association in Taiwan (Taipei, October 2016) [5].

3. Results

Sociodemographic aspects

The sample size consisted of 112 patients out of a total of 3993 patients followed up at CADES/O, representing a POAG prevalence of 2.8%. The patients were male (60.7%) and female (39.3%), representing a sex ratio (M/F) of 1.5. The age of the participants ranged from 15 to 82 years, with an average of 51 ± 16.9 years and a median of 54 years. The 60 - 79 age group was the dominant class in the series. They were mostly office workers (30.4%; $n = 34$) and self-employed (30.4%; $n = 34$). 86.6% ($n = 97$) of the patients were educated, the majority being university graduates (41.1%, $n = 46$). Sixty-three patients (56.3%) lived more than 10 km from the study centre (**Table 1**).

Clinical and therapeutic aspects

Eighty-four patients or 75% of the sample had no known risk factors for glaucoma. Twenty-eight had risk factors, the major ones being hypertension (53.6%) and diabetes (28.3%). A family history of glaucoma was found in 17.9% of the participants. The discovery of glaucoma was recent (during the study period) in 71 patients (63.4%) and old in 41 (36.6%). The iridocorneal angle was

Table 1. Socio-demographic characteristics (n = 112).

Socio-demographic characteristics	Number (%)
Sex	
Male	68 (60.7)
Female	44 (39.3)
Age (years)	
≤19	3 (2.7)
20 - 39	26 (23.2)
40 - 59	40 (35.7)
60 - 79	41 (36.6)
≥80	2 (1.8)
Profession	
Civil servant	34 (30.4)
Liberal	34 (30.4)
Housewife	23 (20.5)
Retired	11 (9.8)
Pupil/student	10 (8.9)
Level of education	
University	46 (41.1)
Secondary	32 (28.6)
Primary	16 (14.3)
Koranic	3 (2.7)
Not educated	15 (13.4)
Distance to home (in Km)	
≤5	28 (25.0)
5 - 10	21 (18.7)
≥10	63 (56.3)

open at grade 4 in 53.6% of the eyes compared with 46.4% at grade 3. The visual acuity of the participants was $\geq 4/10$ in almost 67.0% of the eyes, the mean intraocular pressure was 24.08 ± 8.21 mmHg, the median 22 mmHg and the mode 21 mmHg with 55.36% of the eyes having an IOP of more than 21 mmHg at inclusion. It was 18.95 ± 6.99 mmHg at last check. The median was 18 mmHg and the mode 18.5 mmHg.

Visual field examination was impaired in 59.3% of cases. The patients had been on anti-glaucoma therapy since the discovery of the disease. In the series, 67.9% were on monotherapy, 24.1% on dual therapy and 8.0% on triple therapy. Prostaglandins (55.3%) and beta-blockers (54.5%) were the most commonly used therapeutic classes. Carbonic anhydrase inhibitors were also moderately used (29.5%), myotics and alpha-adrenergics were used by one patient each. Eye drops were prescribed in 74.1% of patients, 2 patients used only tablets and 24.1% used both eye drops and tablets. Patients said they always put the drops in themselves in 41.1%, someone always put the drops in 20.5% and they were sometimes helped by a third person in 38.4%. They had forgotten to put the drops in at least once in 24.1% but respected the prescribed doses in 75.9%. The patients said they always bought the prescriptions themselves in 43.8%, the family always bought them in 48.1% and in 7.1% both simultaneously. They declared that the treatment was accessible in 95.5%. A proportion of 58.0% of the patients said that they always kept the doctor's control appointments. The average number of check-ups was 3.7 ± 1.0 with extremes of 2 and 6 check-ups, the median was 4 check-ups. This was good in 70.2% of cases. Patients were satisfied with the treatment in 77.7% of cases, compared with 22.3% who said they expected more from the doctor.

Compliance with treatment

Compliance was judged to be good in 38.4% of cases, average in 48.2% and poor in 13.4% of cases, with an overall compliance rate of 86.6% (Figure 1).

The correlation was not statistically significant for age ($p = 0.30$), sex ($p = 0.43$), origin ($p = 0.47$), length of illness ($p = 0.96$), route of administration ($p = 0.34$), instigator ($p = 0.12$) or therapeutic regimen ($p = 0.62$). On the other hand, profession ($p < 0.001$), level of education ($p = 0.004$), presence of systemic arterial hypertension ($p = 0.002$), compliance with instillation schedules ($p < 0.001$), compliance with the prescribed dosage ($p < 0.001$), regularity of treatment ($p = 0.004$), compliance with follow-up visits ($p = 0.04$) and the climate of trust between patient and doctor ($p < 0.001$) were the determining factors with the greatest statistical influence on compliance with treatment (Table 2).

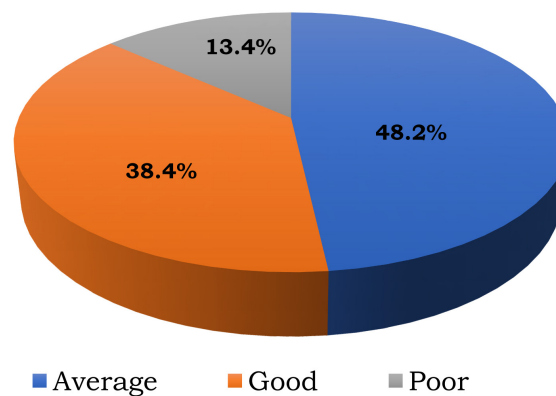


Figure 1. Distribution of patients according to compliance.

Table 2. Factors influencing compliance.

Facteurs	Observance			P
	Good (%)	Average (%)	Poor (%)	
<i>Profession</i>				
Pupill/student	6.2	1.8	0.9	
Civil servant	17.8	12.5	0	
Liberal	8.0	13.4	8.9	<0.001
Housewife	5.3	13.4	1.9	
Retired	0.9	7.1	1.9	
<i>Level of education</i>				
Not in school	1.9	7.1	4.5	
Primary	1.9	10.7	1.9	
Secondary	11.6	12.5	4.5	<0.001
University	23.2	16.0	1.9	
Koranic	0	1.9	0.9	
<i>Presence of hypertension</i>				
Hypertensive	3.6	42.9	7.1	<0.001
Not hypertensive	32.1	10.7	3.6	
<i>Adherence to schedules</i>				
Always	37.5	37.5	0.9	<0.001
Sometimes	0.9	10.7	12.5	
<i>Adherence to the dosage</i>				
Always	37.5	29.5	8.9	<0.001
Sometimes	0.9	18.7	4.5	
<i>Purchasing treatment</i>				
My self	21.4	16.1	6.2	
My family	16.1	28.6	4.5	0.04
Both	0.9	3.6	2.8	
<i>Regularity to visit control</i>				
Always	38.4	19.6	0	<0.001
Sometimes	0	28.6	13.4	
<i>Patient trust in the doctor</i>				
Always	36.6	36.6	4.5	<0.001
Sometimes	1.8	11.6	8.9	

4. Discussion

Study method

Primary open-angle glaucoma, like any chronic disease, poses a real public health problem in terms of patient compliance with treatment. Adherence to medical treatment of POAG, which is lifelong and overly restrictive, deserves the full attention of ophthalmologists, particularly in Africa, who have to deal with a largely uneducated population. As glaucoma is a painless and asymptomatic disease at the beginning, the patient only really feels the signs linked to the disease after several years of evolution. At this stage, the patient perceives the treatment as a constraint because the only signs felt by the patient are the side effects of the medication. Furthermore, it is difficult for the doctor to identify the patient's profile from the first contact and to predict the degree of adherence to the treatment during the follow-up. The resulting non-adherence may be a determining factor in the failure of the treatment and the progression of glaucomatous optic neuropathy. This prospective observational series, whose results are based solely on the clinic and the statements of the participants subjected to an interrogation, sought to identify the issues of compliance with the medical treatment of this frequent and serious pathology. Assessing this compliance accurately is a real challenge and varies according to the methodology used, the number of participants analysed and the analysis criteria used [2]. In the literature, compliance has been studied by four methods including interviewing, use of questionnaires, use of electronic recording devices and evaluation of dispensing data from health insurance schemes [6]. In order to reduce memory bias that could lead to several losses of information, it was preferred in this survey to combine self-reporting and medical follow-up of patients during the six (6) month study period. Tchabi *et al.* [4] in Cotonou and Taktak J *et al.* [7] in Kairouan had also proceeded in this way with the effort of memory that they focused on the last seven (7) days before the survey. Santos *et al.* [2] preferred a prospective survey based solely on the declarations of patients who were subjected to a questionnaire with the memory effort carried out over a rather longer period (six months) before the survey, which could constitute a bias. Both in this series and in others [2] [4] [7], the answers given by the patients are quite subjective and require honesty, which could be another bias. The administration of a questionnaire has a relatively high tendency to overestimate compliance compared to electronic monitoring [2] [6].

Compliance rate

The rate of good compliance in this series is significantly higher than the 10.3% reported by Santos *et al.* [2] and is close to the 40.1% reported in the study by Taktak J *et al.* [7]. The overall compliance rate in the series is above the overall rate described in the literature (40% to 73%) [3]. This rate varies in African studies between 53% - 76% [2] [4]. These differences are due to differences in study methods, sample sizes and criteria for assessing adherence. This series, like that of Taktak J *et al.* [7], retained four fundamental criteria for assessing compliance: compliance with instillation schedules, compliance with the prescribed

dosage, access to (purchase of) treatment, and compliance with follow-up visits. Tchabi *et al.* [4] retained three criteria, while Santos *et al.* [2] retained five. In this series, the rate of non-compliance was relatively low compared to other African studies which reported 24.3% for the Togolese study [2] and 59.8% for the Algerian study [7]. These results could be attributed to considerations of recall effort for each study and the associated biases. This result is strongly influenced by the doctor-patient relationship and the resulting communication. Some patients were unable to instill their drops correctly because they were not properly educated by the doctors or because they were senescent and had to be helped by their relatives. For Detry-Morel [1], up to half of the patients had practical difficulties in instilling eye drops due to a lack of explanation in more than 70% of cases. In the series by Santos *et al.* [2], 86.9% of patients did not insert eye drops according to the correct technique. This reminds doctors and their assistants that they have a duty to take the minimum amount of time to explain the correct instillation technique to patients and to regularly assess their understanding.

Determinants of adherence

It was clearly established in this series that occupation ($p < 0.001$) and level of education ($p < 0.001$) are two socio-demographic factors that have a statistically significant influence on compliance with glaucoma treatment. In the series of Santos *et al.* [2] in Togo, Tchabi *et al.* [4] in Cotonou, Taktak *et al.* [7] in Kairouan, Wane *et al.* [8] in Dakar, it was not influenced by any of the socio-demographic characteristics. Fifty (50) years ago, Vincent [9] had established that gender influenced compliance and that women were more compliant. In the present study, compliance was not influenced by gender ($p = 0.43$), age ($p = 0.31$), length of illness ($p = 0.96$) or distance from home ($p = 0.47$). The presence of systemic hypertension was found to be a factor strongly associated with good compliance with glaucoma therapy. This could be related to the fact that hypertensive patients are used to taking their medication regularly at the indicated doses and times. Regularity of treatment, adherence to instillation schedules, adherence to dosage, and regularity of follow-up visits were also strongly associated with compliance in this and other series [4] [7] [8]. In contrast, Santos *et al.* [2] found that adherence to dosage had no statistically significant influence on compliance. It is clear that instilling more than one drop can quickly deplete the bottle and therefore increase the expense of purchasing the already expensive products, which may discourage the patient and motivate discontinuation of treatment. Patients should be encouraged to accept the help of another person when applying the drops.

Causes of non-adherence

The high cost of anti-glaucoma medication, the forgetfulness and regularity of monitoring with its arsenal of very expensive follow-up examinations, the precarious financial conditions of patients in a context of general crisis, constitute the main factors of poor compliance with treatment in this series. Santos *et al.* [2] also mentioned forgetfulness and the high cost of treatment as the main causes

of non-adherence to glaucoma treatment. Renard JP *et al.* [6] stated that forgetfulness due to memory problems or weariness depending on the context of each patient should be evaluated. For Detry-Morel [1], forgetting would be the most important individual factor. Regarding the cost of treatment (purchase of drugs and follow-up assessment), the health insurance system should be encouraged at all levels of the health pyramid. The state should be singularly involved and make health insurance compulsory for all. In the African context, the prescription of eye drops should take into account the socio-economic level of the patient as the doctor has a choice of several drugs. Ophthalmologists should also promote filtering surgery, which avoids the need for a break in treatment and puts patients on the safe side.

The other cause of non-compliance was the doctor-patient relationship. Many patients blamed their doctors for not giving them enough information about their disease or treatment, as was the case in Togo [2]. This lack of information, education and communication is an individual factor for each doctor but can also be linked to the volume of consultations. These unplanned consultations often mean that the doctor does not have the time to talk to patients, as in Africa very few patients make an appointment. It would still be desirable for doctors to be proactive and to give sufficient information to patients about the disease, its treatment and even behaviour change. For Djafari *et al.* [9], it is important to check whether the information provided has been understood and accepted by the patient. Friedman *et al.* [10] suggest that the level of information provided should be adapted to each patient according to their personality. It must be regularly renewed because the understanding and acceptance of the information provided is gradual. Furthermore, African medicine is confronted with the presence of traditional therapists who propose miracle solutions to patients. As a result, the doctor is perceived as a herald of false diseases without definitive solutions [2]. According to Nordmann JP *et al.* [11], when faced with such a serious condition, a patient who does not trust his or her doctor will tend to change doctors and consequently will move from one provider to another.

5. Conclusion

Glaucoma is a chronic disease and its proper management requires the patient's total and unconditional adherence. Its good compliance inevitably requires information, education and communication from the doctor to the patient. This study made it possible to understand that there is a low rate of compliance among patients followed at CADES/O. The factors of non-adherence encountered in this series were partly related to the patient but mainly to the doctor. Doctors should take the time to explain to patients their disease, its evolution with or without treatment and especially the need for good compliance.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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