Original article

Compliance to topical anti-glaucoma medication among glaucoma patients at Menelik II Tertiary Hospital, Addis Ababa, Ethiopia

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Abstract

Background: Glaucoma is one of the major public health problems. Lowering intraocular pressure has been shown to inhibit the progression of glaucomatous optic nerve damage which depends on compliance with the treatment.

Objectives: To determine the extent of noncompliance to treatment among glaucoma patients at Menelik II Hospital.

Methods: A hospital based cross sectional study was conducted on patients who were on topical anti glaucoma treatment and follow-up at glaucoma clinic, Menelik Hospital during May 1 to July 30, 2014. Four hundred one eligible patients were interviewed with a pretested structured questionnaire by the principal investigator. Medical charts of each patient were reviewed for specific information like type of previous procedures and visual acuity.

Results: Among the 401 patients interviewed**,** 230 patients (57.4%) were found to be noncompliant. Younger ages, higher educational level, previous history of procedures for glaucoma were associated with better compliance. Factors associated with noncompliance included poor vision, more than one drug therapy, fair or poor understanding of the disease, use of other systemic medications, unavailability of drugs in the market, dependency on others for instilling the drops. Sex, side effects of the drugs, number of years with glaucoma and family history were not found to be predictors of noncompliance. The main reasons given by the participants were forgetfulness, followed by running out of medications before visiting the clinic.

Conclusions: The study has indicated the presence of substantial noncompliance of glaucoma patients at a tertiary center. More attention to the issue of noncompliance, including health education and use of memory aids, could result in important benefits in the preservation of sight. [*Ethiop. J. Health Dev.* 2015;29(1):31-36]

Introduction

Glaucoma is a group of diseases which have a characteristic optic neuropathy in common, with associated visual field loss for which elevated intraocular pressure is one of the primary risk factor (1). Glaucoma is the leading cause of irreversible blindness worldwide and next to cataract as a common cause of blindness (2-4). In sub-Saharan Africa, glaucoma is more prevalent and thus has been considered a major health problem for the region (5). Among Ethiopians, it was reported that 41.1% of patients were blind in one or both eyes on presentation, of these 84.8% had unilateral blindness (6, 7).

Glaucoma progression, structural and functional, is associated with elevated IOP, and in a number of studies, lowering IOP has been shown to inhibit the progression of glaucomatous optic nerve damage , leading to a therapeutic focus on lowering IOP(8) . IOP can be lowered by pharmacological therapy, laser therapy, or incisional surgery (alone or in combination). Topical medications are an effective initial therapy in many patients but studies have shown that it is often necessary to use multiple topical medications to achieve target IOP (8). Multiple clinical trials have shown that with effective medical treatment, vision loss can mostly (if not totally) be prevented (9).

Glaucoma medication adherence can be queried by self-report, physician report, direct observation, electronic medication monitors, and pharmacy data. Without a biologic metabolite to measure, no “gold standard” for quantifying glaucoma medication adherence exists (10). Self-reported adherence is probably the most commonly employed measure of adherence used in the clinical care of patients. Self-report, however, overestimates adherence compared with the results of an electronic monitor. Proper medication adherence requires taking the prescribed medication each day, without gaps in therapy. It is likely that gaps in treatment adherence are associated with worse clinical outcomes (11).

Non-adherence is a problem because it results in failure of a prescribed therapy to achieve its goal fully. Moreover, it can have a negative impact on therapeutic choice by leading clinicians to believe a therapy isn't working and so unnecessarily switch course. In the case of glaucoma therapy, variations in dosing patterns whether it is missed doses, mis-timed doses, or overdosing can lead to less lowering of IOP and/or an increase in side effects that diminish the tolerability of the therapy (12). Barriers to glaucoma treatment adherence can be divided into four categories: provider factors, situational/environmental factors, medication regimen factors, and patient factors. The purpose of this study was to assess adherence to topical anti-glaucoma medication among glaucoma patients and provide initial information for future related studies.

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Methods

A hospital based cross- sectional study was conducted among glaucoma patients age 18 years and above at the Glaucoma Clinic of the Department of Ophthalmology, Menelik II Hospital, from May to July, 2014. The Department of Ophthalmology of the hospital is a tertiary referral center providing general and subspecialty services and training.

Since there was no published data on compliance with anti-glaucoma medication in Ethiopia, sample size was calculated assuming compliance to be 50%. Accordingly, by using confidence interval of 95% and margin error of 5% with non-response rate of 5%, a sample size of 401 patients was selected for the study. The study was approved by the Research and Publication Committee of the Department of Ophthalmology at Addis Ababa University. Informed verbal consent was also obtained from each interviewed patient.

Those eligible patients were selected based on the following factors. Those patients who had been diagnosed as open angle glaucoma, chronic angle closure glaucoma, glaucoma suspect, or ocular hypertension or those who had undergone past laser or surgical glaucoma therapy, but not with in the last 3 months before study enrollments were included. In addition, glaucoma patients whose age was 18 years or older, who had been taking one or more topical hypotensive medication(not systemic) in one or both eyes at least for the past 6 months and had been visiting the Glaucoma Clinic for their routine follow up were studied. Those who were on other topical medication, unwilling to participate and unable to communicate were excluded.

Charts of each eligible patient were reviewed regarding the following information: visual acuity, address, duration of follow up, the type of glaucoma, the types and doses of the prescribed drugs and the type of procedure if any. Each consecutive patient who fulfilled the above criteria was interviewed by the first author using a pretested structured questionnaire. The interview was conducted early in the morning in a separate room before patients were seen by their physician.

It was ascertained that whether participants took their morning dose on the day of clinic visit, with the possible reasons if they did not. An attempt was made to estimate the number of missed doses on average during the past week. Compliance made within a week's time was considered in order to minimize recall bias as average age of patients was older (11, 13). Similarly, compliance for the morning dose was taken as an index date. If a patient admitted that s/he had missed doses, the reason for it was asked. Inquiries were made as to the side effects, difficulties in instilling drops, and on the availability of drugs in the pharmacy. Details were sought on use of other drugs for chronic illness and whether patients were getting drugs for free or not.

Data were cleaned, edited, coded, and analyzed using SPSS version 20.Descriptive statistics in the form of frequencies and percentages were used to interpret the results. Prevalence of adherence was described using single and parametric measurement with 95% confidence limits. To assess factors associated with non-compliance, cross-tabulating of categorical variables with the dependent variable, and chi-square statistics was made. Statistical significance was considered when the p-value stood at <0.05.

Operational Definitions:

The following operational definitions were used to assess patients' understanding of glaucoma and categorize their compliance:

Knowledge about glaucoma was categorized as follows:

- Very good if their answers were 2 or more of elevated eye pressure causing blindness, eye disease causing visual loss, or eye disease causing nerve damage;
- Good if they responded, eye disease with elevated eye pressure;
- Satisfactory if they answered: eye pressure, eye nerve damage, or visual field loss;
- Fair if they responded only as eye disease causing blindness; and
- Poor if their answer was "I do not know".

With regard to compliance, 'full compliance' means patient's adherence to regimen and not missing any medication for the last one week; 'partial compliance' being missing one or more eye drops per week. 'Total non-compliance' was defined as not taking any prescribed glaucoma medication at all. 'Non-compliance' stands for missing any of the drops (both partial and total non-compliance).

In this study, best corrected vision was defined as vision after correcting refractive error; else they were considered as non-corrected vision.

Results

A total of 401patients were interviewed during the study period. Majority of them,> 80%, were aged above 50. Two thirds of them were males. The average age of participants was 55.5 years with a range of 26-86 years. Three-hundred-seventeen (79.1%) were from Addis Ababa. A large number of participants, 247 (61.6%), had educational level of elementary or secondary school, while only 3 (0.7%) were educated above secondary school and the remaining 151 (37.7%) were illiterate or only able to read and write. Significant number of the patients, 272 (67.9% had been on follow up for more than three years (Table 1).

Table 1: **Socio-demographic characteristics of participants, Menilik II Hospital, Addis Ababa 2014.**

Socio demographic data	Number (%)
Age	
19-30yr	12 (3%)
31-40yr	11 (2.7%)
41-50yr	54 (13.5%)
51-60yr	124 (30.9%)
61-70yr	112 (27.9%)
>70yr	88 (21.9%)
Sex	
Male	273 (68.1%)
Female	128 (31.9%)
Address	
Addis Ababa	317 (79.1%)
Oromia	41 (10.2%)
Amahara	30 (7.5%)
SNNPR	13 (3.2%)
Education	
Illiterate	85 (21.2%)
Able to read and write	66 (16.5)
Primary school	103 (25.7%)
Secondary school	144 (35.9%)
Above secondary(college)	3 (0.7%)
Number of years on follow up	
6 month to 1 year	45 (11.2%)
1-3 years	84 (20.9%)
3-5 years	109 (27.2%)
5-10 years	80 (20.0%)
Total	**401**

Two-hundred-thirty (57.4%) patients had admitted missing at least some of their prescribed medication (non-compliance) in the past one week before presenting to the clinic, and the 95% confidence limit ranges from 52.5% to 62.2%. The most frequently given reason was forgetfulness followed by running out of medication before their clinic visit. Nine of the patients complained that the drugs were unavailable in the market. Three of them sometimes failed to use their drops because they caused discomfort. Six of them had financial problems. Another six patients gave different reasons for their non-compliance like difficulty in getting to the chemist shop, inconvenience at workplace or said drops did not do anything for their eyes (Fig 1 and Table 2).

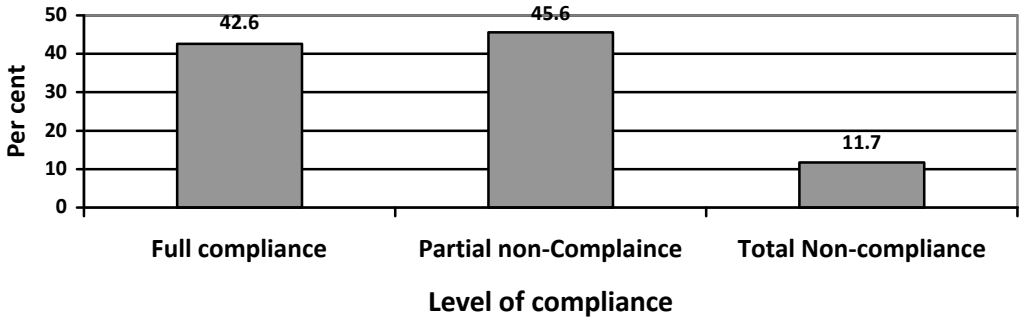

Figure 1: **Level of compliance to anit-glaucoma medications (n=401); Menilik II Hospital, Addis Ababa, 2014**

Table 2: **Main reasons given by participants for missing their doses in the last week, Menilik II Hospital, Addis Ababa, 2014.**

Reason	Partial compliance	Total Non compliance	Total
Forgetfulness	102	3	105 (45.7%)
Run out of drops	70	31	101 (44%)
Unavailability of drugs	6	3	9 (3.9%)
Discomfort	0	3	3 (1.3%)
Financial	2	4	6 (2.6%)
Others	3	3	6 (2.6%)
Total	**183(79.5%)**	**47(20.4%)**	**230(100%)**

The level of compliance was compared between those patients who took mono-therapy and those who were on dual therapy. The result showed that those on mono-therapy were more compliant than those on dual therapy (p=0.003). Patients were assessed for their understanding of the disease and they were classified into 5 groups based on their response as those with very good (16.5%), good (5.2%), satisfactory (3.7%), fair (54.6%), and poor (10%) level of understanding. Very good and good groups were compared against fair and poor groups and the result showed that the former groups were found to be more compliant with their regimen than the latter ones (p=0.002%).

Younger patients were found to have a better understanding of their diagnosis. The difference was statistically significant (p<0.001). Better educated ones also had a better understating; 55.6% of patients with better understanding than satisfactory had secondary school educational level, compared with 26.3% of those who were grouped as having fair and poor understanding (p<0.001). There was statistically significant association between higher level of education and better compliance (p=0.043).Those with a better vision were more compliant than those with poor vision (p=0.004).Patients with history of previous surgical procedures were more compliant than those without (p=0.003). Use of other medication for systemic illness decreased compliance (0.043). Younger patients were found to be more educated better understand their disease and had a better level of compliance (p=0.04). Those patients who were dependent on others for their drop instillation showed poor degree of compliance compared with those who administered their own eye drops (p=0.002). (Table 3).

Table 3: **Associated factors that determine non- compliance, Menelik II Hospital, Addis Ababa, 2014. (n=401)**

Factor	***Level of non-compliance***		P-Value
Number of drug	Mono therapy (18%)	Dual therapy (44%)	P=0.003
Level of understanding	Very good & good (28%)	Fair &poor (84%)	P=0.002
Educational level	Higher (36%)	Lower (47%)	P=0.043
Best corrected vision	Better vision (52%)	Poor vision (58.5%)	P=0.004
Previous glaucoma procedure	Yes (52.2%)	No (61.2%)	P=0.003
Use of systemic drugs	Yes (67%)	No (54%)	P=0.017
Unavailability of drug (market)	Yes (63%)	No (53%)	P=0.043
Dependent for drop instillation	Yes (82%)	No (55%)	P=0.002

The following factors did not appear to affect compliance: sex, address, side effect of drugs, number of years since diagnosis, family history of glaucoma, and whether patients got the drugs for free or not.

The secondary goal of the study was to assess whether patients took their morning dose before presenting to the clinic and the result showed that 168 (42%) of them admitted to missing their morning dose on the day of clinic visit. The reason given for their non-compliance is shown in table 4.

Table 4: **Reasons given by participants for missing their morning dose on the day of visit, Menilik II Hospital, Addis Ababa, 2014. (n=401)**

Reasons	Frequency	%
Forgetfulness	51	30.4
Run out of medication	78	46.4
Thought to have drop at the clinic	33	19.6
Thought to affect examination	3	1.8
Discomfort	3	1.8
Total	**168**	**100**

Discussion

Glaucoma is the leading cause of irreversible blindness in sub-Saharan Africa, which is further compounded by poor awareness in the region (4). Increasing compliance with anti-glaucoma medication decreases this irreversible blindness caused by the disease. This article reports a study of 401 patients, using data from medical charts, along with interviews to explore factors associated with treatment adherence.

The prevalence of non-compliance in this study was found to be 57.3% (partial compliance and total non-compliance), which was similar to study done in Jamaica with 58% (11). However, it is higher than a study conducted in the Netherlands with 50% (13), and much higher than that of a study in Sweden with 27% (14). The major reason for such difference may be due to difference in study settings, though awareness about glaucoma and definitions of compliance also probably account for the variations.

In order to improve compliance, it is important to find out why patients miss their doses. Even though it is difficult to overcome, forgetfulness was the main reason given by patients. This tallies with a published report from Jamaica and others (11, 15-19).Unlike the other studies, this study showed reversed 'white coat' effect in some cases, as patients whose eye-drops were finished from few days to a week before their clinic appointment (n=101) did not refill their prescription. This happened due to various reasons, including the patients' assumption that the prescription or the dose might be changed (n=45); the fact that their appointment day was near (n=25). These patients also had a tendency not to use their eye-drops on the day of clinic visit, either because 'the doctor was going to use drops in the eyes' or because they had to leave early to get to the eye clinic and forgot to use them.

This study showed that there was a strong association between vision and compliance. Even though it is difficult to establish cause–effect relationship from this study, the reason could be the fact that those patients with better vision have less difficulty to identify and apply their drops than those with poor vision. This result is consistent with other studies, (19, 20, and 21). Consequently, patients who were on mono-therapy were more likely to better comply than those on dual therapy, because of less complexity of doses and easy-to-follow instructions (15, 16, 20, 22). Those patients who had better understanding of their disease were found to be more compliant than those with a fair and poor understanding - which is pointed out in many studies (23, 24). Like in other studies, the association between higher level of education and level of compliance was statistically significant which was indirectly associated with better understanding of the use of medications (25, 26).

As described in multiple related studies, this form of assessing (using questionnaire), the level of compliance is the least favorable compared to the other methods because of an overestimated result of compliance. Participants were aware that they were under study which might cause an overestimation of their compliance for fear of being judged. Recall bias was difficult to eliminate. It was difficult to draw a cause and effect relationship among variables. The white coat effect as well as considering patients who had finished their drops few days ago as non-compliant might not reflect the actual compliance level, but may underestimate the real non-compliance. Therefore, considering those limitations, readers should consider to take the findings carefully.

Conclusions and Recommendations:

Substantial level of non-compliance was found to be common in the study population. Therefore, the study has described well that the non-compliance rate with anti-glaucoma medication was relatively high.

Paying more attention to the issue of noncompliance could result in important benefits in the preservation of sight. The following measures would probably improve compliance: to simplify the regimen as far as possible, ensure that the patient is aware of the disease and the long-term treatment by health education, dispense sufficient amount of bottles for the period of appointment and to use memory aids like counseling other family members or to use written instruction.

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