Original Article

COMPLIANCE WITH MEDICAL THERAPY IN GLAUCOMA PATIENTS IN THE NATIONAL HOSPITAL, ABUJA.

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ABSTRACT

Aim: To determine the adherence to drug therapy of glaucoma patients at the National hospital, Abuja and factors affecting compliance with medical therapy.

Methods: This was a prospective study which was carried out among patients with Primary open angle glaucoma at the Eye clinic of the National Hospital Abuja. All glaucoma patients presenting for the first time in the hospital eye clinic over a one year period with a diagnosis of primary open angle glaucoma were enrolled in the study. Data was obtained using interviewer administered questionnaires. The patients were followed up for a minimum period of 3 months to determine the level of compliance and reasons for default. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 15.

Results: Only 110 patients (72.3%) of the 152 glaucoma patients met the inclusion criteria of a minimum follow up of 3 months. The frequency of instillation showed that 63 patients (57.3%) used drops once daily, 46 (41.8%) used drops twice daily and 1 patient (0.9%) used drops thrice daily. Compliance rate in this study was 71.8%. The majority of patients (56.4%) were in compliance grade II. The main reason for missing doses was forgetfulness (64.5%) and the majority of them were in group II. The time of day patients were most likely miss their drugs was at night followed by the morning dose. Patients with mild to moderate visual field defects were more likely to be compliant than those with severe visual field defect ($p<0.05$). Educational status and occupation were significantly associated with compliance ($p<0.01$). Those with tertiary level of education were most likely to comply with medical therapy when compared with those with lower levels of education. Those in higher occupational classes were also more likely to comply with medical treatment when compared with those in the lower levels. Patients with higher monthly incomes complied better than patients with lower monthly incomes ($p<0.01$). Good knowledge was significantly associated with good compliance.

Conclusion: Glaucoma patients attending the Eye Clinic of the National Hospital, Abuja complied better with medical therapy compared with what was reported in previous studies from other parts of Nigeria. Patients who had good knowledge of the disease, glaucoma, complied better than those who had poor knowledge. Furthermore, knowing the name of the disease was significantly associated with good compliance.

Keywords: glaucoma, compliance, medical therapy, non-compliance, adherence, default

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INTRODUCTION

Patient compliance with treatment is an important factor in the management of chronic diseases such as primary open-angle glaucoma.[1,2]

Poor compliance can be inimical to successful medical treatment of glaucoma.[1,2,3] Poor compliance ranges from missed doses to inadequate spacing of doses. In studies on compliance, two methodological problems arise: its definition and the correct identification of patients as compliers or non-compliers. Different rates of default are used in various studies to classify patients into compliant and non-compliant. The most frequently cited definition for noncompliance is "missing doses more than once a week".[4] It should be noted however, that compliance is not a dichotomous outcome but rather exists on a continuum.[2,4] Furthermore, compliance will only influence prognosis indirectly by ensuring adequate intraocular pressure control, which is only one risk factor determining prognosis.

Oji[5] reported about 3 decades ago that the non-compliance rate in Nigeria was 60%. More recently Omoti et al[6] in a prospective study showed that the non-compliance rate in Benin City, Nigeria, was 63.2%. The patients in the study from Benin City used the older antiglaucoma drugs such as pilocarpine, timolol maleate, betaxolol, oral dichlorphenamide and oral acetazolamide. The major reasons for default included lack of visual improvement (20.9%), side effects (16.4%), high cost of drugs (14.9%) and exhausted dugs (14.9%). Another prospective study in Benin City in patients using newer medications such as topical carbonic anhydrase inhibitors, prostaglandin analogues and $beta_2$ agonists, by Omoti and Ukponmwan[7] showed an even higher non-compliance rate of 66.1%. The major reasons for defaulting were side effects (36.6%), scarcity of drugs (22%) and high cost of drugs (12.2%).

In a more recent study from Tunisia, only 40.5% of 132 adults studied complied positively with medications.[8] One factor associated with good compliance in this study was patient's good knowledge of the disease and its treatment. Studies from Western Europe show a non compliance rate of 28-42% which is much less than about 60% in developing countries.[4,9,10] Forgetfulness has been reported as a major cause of non-compliance in developed countries.[11] Various memory aids have been devised to improve drug compliance in glaucoma. These include a written instruction sheet,[12] C cap prescription refill formulations,[13,14] and a medication alarm device (Timecap)[15]. The C cap[13,14] and the timecap[15] have been shown to significantly improve compliance in glaucoma patients. In a prospective, observational cohort study using the Travatan Dosing Aid (DA; Alcon, Fort Worth, TX) to administer travoprost as prescribed, nearly 45% of patients using an electronic monitoring device who knew they were being monitored and were provided free medication used their drops less than 75% of the time.[16] Patients reported far higher medication use than their actual behaviour. They concluded that the ability of the physician to identify which persons are poorly adherent from their self-report or from other subjective clues is poor.[16] A study designed to identify risk factors for poor adherence to topical once daily therapy for glaucoma, showed that those who failed to take more than 75% of eye drop doses were more likely to be African American and to report poor health.[17] Those in the youngest and oldest age groups were less adherent to eye drops, although this finding was not always statistically significant. A meta-analysis of eight randomized controlled studies designed to summarise the effects of interventions for improving adherence to ocular hypotensive therapy in people with ocular hypertension or glaucoma showed that interventions involving simplified dosing regimens, reminder devices, education and individualised care planning, did show improvements in adherence rates.[18] Chen reported that noncompliance with the treatment regimen was significantly associated with development of blindness.[19]

MATERIALS AND METHODS

All new patients presenting in the eye clinic of the National Hospital, Abuja, with a diagnosis of glaucoma were interviewed and examined using a predesigned questionnaire that had been

pretested in a private eye clinic in Abuja. Information on age at presentation, sex, marital status, religion, geographical abode, educational and socioeconomic status were obtained using a pre-designed questionnaire. The presenting complaints and duration of symptoms, type of treatment prior to presentation, any associated systemic disease and family history of glaucoma were recorded.

Inclusion Criteria

Patients were included in the study if they met the following diagnostic criteria:

(a) Typical glaucomatous excavation (cupping) and atrophy of the optic disc
(b) Glaucomatous visual field defect such as arcuate defects, nasal step, paracentral scotoma and generalised depression.
(c) Open and normal appearing angles on gonioscopy.
(d) Absence of secondary causes of open angle glaucoma.
(e) Intraocular pressures above 21mmHg by applanation tonometry were viewed with more suspicion although levels below 21mmHg were included.
In cases where the visual field analysis was not possible due to poor vision, a high intraocular pressure and pathological cupping of the optic disc were sufficient for the diagnosis.

Exclusion Criteria

Patients were excluded if they had the following:

(a) Significant media opacities such as corneal opacities and cataract.
(b) Retinal diseases which may cause visual field defects such as retinitis pigmentosa, extensive chorioretinal scars, branch retinal vein occlusion etc.
(c) Macular disease which has significantly impaired central vision.
(d) Patients who did not give consent.

Classifications

The occupation of the patients were grouped according to their social classes modified from the British registrar general's classification as follows.[20]

Class I. Higher professions eg Doctors, engineers, lawyers, businessmen, politicians, lecturers, entrepreneurs, management staff of institutions, etc
Class II. Lesser professions eg Teachers, Nurses etc
Class III. Skilled workers eg typists, clerks, technicians, carpenters, auto mechanics, etc
Class IV. Semi-skilled workers eg. Petty traders, machine operators, hairdressers, barbers, etc
Class V. Unskilled workers eg. Subsistence farmers, housewives, cleaners, messengers, etc

Severity of the disease was classified by the criteria given by the American Academy of Ophthalmologists Preferred Practice Pattern.[21]

- Mild: characteristic optic nerve abnormalities consistent with glaucoma and a normal visual field as tested with standard automated perimetry.

- Moderate: characteristic optic nerve abnormalities consistent with glaucoma and visual field abnormalities in one hemifield and not within 5 degrees of fixation.

- Severe: characteristic optic nerve abnormalities consistent with glaucoma and visual field abnormalities in both hemifields and loss within 5 degrees of fixation in at least one hemifield.

This was slightly modified in this study due to the peculiarity of our environment where exclusion of the glaucoma patients with vision so poor that they cannot perform visual field test will exclude a high proportion. These patients were included in the severe category. Furthermore, as our facilities are not advanced enough to diagnose all pre perimetric glaucoma, those with suspicious discs

and minimal unilateral visual field anomalies like enlargement of the blind spot/ one paracentral scotoma were placed in the mild category.

The patients were followed up for a minimum period of 3 months to determine the level of compliance and reasons for default. All the patients were initially started on medical therapy. Only 110 patients (72.3%) who met the inclusion criteria of a minimum follow up of 3 months were included in the study on compliance. One hundred and one (66.4%) were on topical medication only while 9 patients (5.9%) used topical medication and oral drugs. Of the 110 patients, 78 (70.9%) used a single eyedrop, usually a prostaglandin analogue such as latanoprost 0.005% or travoprost 0.004% or a beta blocker such as timolol 0.5% or betaxolol 0.5%; while 32 patients (29.1%) used two or three eyedrops, usually a beta blocker such as timolol 0.5% or betaxolol 0.5%; a prostaglandin analogue and a topical carbonic anhydrase inhibitor such as brinzolamide or dorzolamide. The tablet occasionally used was acetazolamide.

Compliance was carefully evaluated, occasionally using comments and questions such as: Everyone forgets to take his or her eye drops sometimes. How many times on the average per week do you miss yours? The patients were also asked if they used that morning's dose or the previous night's dose. The patients were also told to bring whatever eyedrops that was left to their next clinic visit. In addition the intraocular pressure control was also used to assess compliance. The reasons for missing doses were sought. It is possible that different degrees of compliance might show different causal factors.

The patients were therefore classified into five groups as follows.[4,6,7]
Group I: Patients who claimed that they used their medications as prescribed.
Group II: Patients who said that they missed an occasional dose per week.
Group III: Patients who missed more than the above but apparently used at least half of the medication (one or more eyedrops) prescribed.
Group IV: Patients who used some but less than half of the medicines prescribed.
Group V: Patients who did not use any of the prescribed medication.
Group I & II are classified as compliant and groups III, IV and V as non-compliant.

Data analysis was done by computer using the statistical package for the social sciences (SPSS) version 15.0. Chi-squares and cross tabulations using Yates correction whenever necessary, chi-square for trend and Fisher's exact test were used to determine statistical significance which was set at 5%. Odds ratios (OR), 95% confidence intervals (CI) were also calculated. Ranges, means and standard deviations (SD) were also determined.

RESULTS

One hundred and fifty two patients with primary open angle glaucoma attending the consultant outpatient clinics of the National Hospital, Abuja, who met the inclusion criteria, were seen during the study period. Table 1 shows that there were 87 males (57.24%) and 65 females (43.76%).The male to female ratio was 1.34:1. The mean age was 51.73yrs (SD ± 12.04). The mean age of the males was 52.17yrs (SD ± 12.05) and for females, the mean age was 51.14yrs (SD ± 12.09). The age range was 23 years to 82 years.

The frequency of instillation showed that 63 patients (57.3%) used drops once daily, 46 (41.8%) used drops twice daily and 1 patient (0.9%) used drops thrice daily. Compliance rate in this study was 71.8% (Table 2). The majority of patients (56.4%) were in compliance grade II (Table 3). The number of patients who missed any drugs (Groups II – V) was 93 (84.5%).

The main reason for missing doses was forgetfulness (64.5%) and the majority of them were in group II (Table 4). The time of day patients were most likely miss their drugs was at night followed by the morning dose (Table 5).

Patients with mild to moderate visual field defects were more likely to be compliant than those with severe visual field defect ($p<0.05$) (Table 6a). Gender, marital status, religion, location of abode and visual acuity were not significantly associated with compliance ($p>0.05$). Educational status and occupation were significantly associated with compliance ($p<0.01$) (Table 6b). Those with tertiary level of education were most likely to comply with medical therapy when compared with those with lower levels of education. Those in higher occupational classes were also more likely to comply with medical treatment when compared with those in the lower levels.

Monthly income was significantly associated with compliance ($p<0.01$) (Table 7). Patients with higher monthly incomes complied better than patients with lower monthly incomes. Good knowledge was significantly associated with good compliance (Table 8). With Fisher's exact test, p value was also 0.0004, OR = 8.929 and 95% CI = 2.541-31.375 for knowledge of the name of the disease. Fisher's exact test also gave a p value of 0.0002 for knowledge of the disease. The OR was 7.694 and 95% CI was 2.551-23.145. Thus patients with knowledge of the name of the disease were about nine times more likely to be compliant than those who did not know the name of the disease. Also, patients with good knowledge of the disease were about 8 times more likely to be compliant than those who did not have good knowledge of the disease.

TABLE 1: AGE & SEX DISTRIBUTION OF RESPONDENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

Age group (years)	**Sex**		**Total N (%)**
	Male N (%)	Female N (%)	
Less than 30	6 (6.1)	4 (6.2)	10 (6.6)
31-40	7 (8.0)	11 (16.9)	18 (11.8)
41-50	21(24.1)	13 (20.0)	34 (22.4)
51-60	32 (36.8)	18 (27.7)	50 (32.9)
61-70	17 (19.5)	19 (29.2)	36 (23.7)
71 and above	4 (4.6)	0	4 (2.6)
Total	87 (100)	65 (100)	152 00)

TABLE 2: COMPLIANCE STATUS REPORTED BY RESPONDENTS

Compliance status	Frequency (N)	Percentage (%)
Compliant	79	71.8
Not compliant	31	28.2
Total	110	100

TABLE 3: GRADES OF COMPLIANCE AMONG GLAUCOMA PATIENTS

Groups	**Frequency (N)**	**Percentage (%)**
1	17	15.5
11	62	56.4
111	26	23.6
1V	5	4.5
V	0	0
Total	110	100

TABLE 4: REASONS FOR POOR COMPLIANCE ACCORDING TO GROUPS

REASONS	**II**	**III**	**IV**	**V**	**Total**	**Percentage**
High cost of drugs	3	7	1	0	11	11.8
Scarcity of drugs	0	2	0	0	2	2.1
Forgetfulness	49	11	0	0	60	64.5
Inconvenience	4	4	2	0	10	10.8
Side effects	6	1	0	0	7	7.5
Difficulty in instilling drugs	0	0	2	0	2	2.1
Expended drugs	0	1	0	0	1	1.2
Total	62	26	5	0	93	100

TABLE 5: TIME OF THE DAY RESPONDENTS ARE MOST LIKELY TO MISS THEIR DRUGS

TIME OF THE DAY	Frequency (N)	Percentage (%)
Morning dose	33	35.4
Mid-day dose	10	10.8
Evening dose	5	5.4
Night dose	45	48.4
Total	93	100

DISCUSSION

The default rate in this study was 28.2% while 71.8% of patients were compliant with their glaucoma medication. The non-compliance rate in this study was much lower than what has been reported in previous studies in Nigeria which range from 60%-66.1%.[5,6,7] This implies a much better compliance among glaucoma patients in Abuja. This may be because of the higher socioeconomic status and income of these patients. In addition, many of the newer drugs which were scarce at the time of the previous studies are now more readily available and accessible. Furthermore cheaper alternatives to these drugs and generics are now more readily available. The non-compliance rates in this study is quite similar to the rates of 22.1% to 42%reported in advanced countries.[4,9,10,11] The main reason for non-compliance in this study was forgetfulness (64.5%). This sharply contrasts with earlier studies from Nigeria but similar to advanced countries. In an earlier study from Benin City, Nigeria, lack of visual improvement, side effects, high cost of drugs and exhausted drugs were the main reasons for default.[6] In another report on compliance with the newer glaucoma drugs, side effects, scarcity of drugs and high cost of drugs were the main reasons for default.[7] In this study from Abuja, high cost, inconvenience and side effects were much less common causes of default compared with forgetfulness. The higher earning power of these patients and the higher levels of enlightenment may have contributed to this difference. This finding is similar to studies from advanced countries where forgetfulness is the most common reported reason for default.[93]. Forgetfulness was the reason given for missing an occasional dose per week. This is similar to other reports.[6,10]

Like in earlier studies in Nigeria[6,7] and in England,[10] gender, marital status, and religion did not significantly affect compliance. Tertiary level of education was found to be significantly associated with good compliance ($p<0.01$). This is expected because patients with higher levels of education are more enlightened and are more likely to understand the disease and comply with medical treatment. Higher occupational status was significantly associated with good compliance ($p<0.01$). Patients in the higher professions, lower professions and skilled workers complied better than those below them. This is expected because patients in the higher professions are likely to be more educated and can more easily afford their drugs. Contrary to what was expected, monthly income did not appear to have a significant effect on compliance. However, it was observed that patients with higher monthly incomes complied better than patients with lower monthly incomes. In contrast to this study, educational status and occupational status were not significantly associated with compliance in some earlier

TABLE 6a: FACTORS AFFECTING LEVEL OF COMPLIANCE WITH MEDICAL THERAPY

CHARACTERISTICS		LEVEL OF COMPLIANCE		Fisher's odds ratio (95%CI)	p-value
		GOOD. N=79 (71.8%)	POOR. N=31 (28.2%)		
Sex	Male.	40 (69.0)	18 (31.0)	0.7407 (0.3201-1.714)	0.5294
	Female.	39 (75.0)	13 (25.0)		
Marital status	Married.	69 (72.6)	26(27.4)	1.327 (0.4140-4.253)	0.7582
	Not married.	10 (66.7)	5(33.3)		
Religion	Christian.	56(68.3)	26 (31.7)	0.4682 (0.1601-1.370)	0.2244
	Muslim.	23 (82.1)	5(17.9)		
Location	FCT and environ	71 (68.2)	24 (31.8)	2.589 (0.8486-7.896)	0.1209
	Outside FCT	8 (53.3)	7 (46.7)		
Visual field	Mild-moderate field defect	66 (77.6)	19 (22.4)	3.206 (1.257-8.177)	0.0212*
	Severe field defect	13 (52.0)	12 (48.0)		
Visual acuity	Not blind at presentation	75 (72.8)	28(27.2)	2.009 (0.4226-9.551)	0.3999
	Blind at presentation	4 (57.1)	3 (42.9)		

*Statistically significant.

studies in Nigeria.[6,7] However, this study is in agreement with the previous studies that monthly income was not statistically significant. The explanation given for this by the authors was the additional peculiar problems encountered in their environment which may arise from both educational and economic underdevelopment, scarcity of drugs, cultural attitudes and difficulty with transportation. The socio-economic status may also not have affected compliance in these studies because of their extended family system.[6,7] Patients with better visual fields at presentation were more likely to comply with medical therapy than those who presented with severe visual field defects (odds ratio=3.206, $p<0.05$). This may be because these patients who present early are more likely to have higher educational and socioeconomic status and can more easily afford the drugs.

TABLE 6b: OTHER FACTORS AFFECTING LEVEL OF COMPLIANCE WITH MEDICAL THERAPY

CHARACTERISTICS		LEVEL OF COMPLIANCE		Chi-square	p-value
		GOOD. N=79 (71.8%)	POOR. N=31 (28.2%)		
Educational status	None	4 (80.0)	1 (20.0)	25.946	0.000*
	Primary	15 (65.2))	8(34.8)		
	Secondary	0(0)	8(100)		
	Tertiary	60 (81.1)	14 (18.9)		
Occupation	Higher professions	27 (84.4)	5 (15.6)	24.063	0.002*
	Lower professions	24 (82.8)	5 (17.2)		
	Skilled workers	9 (100)	0(0)		
	Semi-skilled workers	9(42.9)	12 (57.1)		
	Unskilled workers	10(52.6)	9(47.4)		

*Statistically significant.

TABLE 7: RELATIONSHIP BETWEEN MONTHLY INCOME AND LEVEL OF COMPLIANCE WITH MEDICAL THERAPY

CHARACTERISTICS	Level of compliance		Odds Ratio	χ^2 for trend	p-value
Monthly income	Good	Poor			
< N50,000	27	23	1.00	12.439	0.00042*
N50,000-N99,999	11	3	3.12		
N100,000-N149,999	22	3	6.25		
N150,000-N199,999	8	1	6.81		
≥ 200,000	11	1	9.37		

*P value was statistically significant.

A statistically significant difference was found when compliance was compared with knowledge of the eye condition (odds ratio=7.694, p<0.01). The association was such that patients who had good knowledge of the disease, glaucoma, were about 8 times more likely to comply than those who had poor knowledge. Furthermore, knowing the name of the disease was significantly associated with good compliance (odds ratio=8.929, p<0.01). Patients who knew the name of the disease were almost 9 times more likely to comply than those who did not. This emphasizes the need for adequate education of all glaucoma patients. This result is in agreement with previous studies from Nigeria and from advanced countries.[6,7,10] In these studies, it was found that just knowing the name of the eye condition was significantly associated with good compliance.

TABLE 8: RELATIONSHIP BETWEEN KNOWLEDGE AND COMPLIANCE

CHARACTERISTICS		Level of compliance		Chi-square	df	p-value
		Compliant N=79 (71.82%)	Non compliant N =31 (28.18%)			
Knowledge of name of the disease	Glaucoma	75 (78.13)	21 (21.87)	12.48	1	0.0004
	Not glaucoma	4 (28.57)	10 (71.43)			
Knowledge of disease	Good knowledge	73 (79.35)	19 (20.65)	13.558	1	0.0002
	Poor knowledge	6 (33.33)	12 (66.66)			

In conclusion, glaucoma patients attending the Eye Clinic of the National Hospital, Abuja complied better with medical therapy compared to what was reported in previous studies from other parts of Nigeria. Compliance with medical therapy was found to be (71.8%) which compares favourably with advanced countries. The commonest reason for non-compliance in this study was forgetfulness (64.5%). High cost, inconvenience and side effects were much less common causes of default compared with forgetfulness. Patients who had good knowledge of the disease, glaucoma, complied better than those who had poor knowledge. Furthermore, knowing the name of the disease was significantly associated with good compliance.

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