

## Socio-demographic determinants of glaucoma medications compliance: A North Indian cross sectional study

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### Abstract

**Introduction:** To investigate the level of compliance with glaucoma medications in a clinical setting of a tertiary north Indian hospital amongst both rural and urban patients and the factors associated with failed compliance. Thus to improve patient care and reducing visual deterioration and loss from glaucoma.

**Method:** This was a Cross sectional study done at the Glaucoma Clinic, Indira Gandhi eye hospital and research centre Lucknow, between October 2014 and March 2015. 198 patients in the clinic were administered a questionnaire by the doctor. All patients were examined to make sure they met the inclusion and exclusion criteria and then a standard questionnaire was filled for each patient by direct questioning and also from case records. Impact of age, gender, place of residence, religion, education, social status, knowledge about disease, systemic illness, other medical treatment, duration of treatment and number of anti-glaucoma medication on compliance was evaluated. Data was analyzed using SPSS version 15.0. Data has been represented as numbers and percentages. Associations were evaluated in terms of odds ratio and tested using chi-square test.

**Results:** Out of 198 patients enrolled - 30.8% were females, 30.8% were in the age group of 61-70 years age group, 60.1% had an urban background, 73.3% were aware that they had glaucoma and 66.7% were under treatment for more than 2 years. Although rate of compliance varied among different age groups ranging from 0 to 34.4% yet this difference was not significant statistically ( $p=0.072$ .)

The odds of compliance were higher ( $OR>1$ ) among females as compared to males, urban as compared to rural, Hindus as compared to Muslims, 12<sup>th</sup> Class/ Graduates as compared to Uneducated/Primary educated, Higher socioeconomic strata as compared to other socioeconomic strata, those having knowledge about disease as compared to those not having knowledge about disease, having shorter duration ( $<2$  years) of disease and those taking single AGM as compared to those taking multiple, however, this difference was significant statistically only for place of residence, education, social status, duration of treatment and number of AGMs only ( $p<0.05$ ).

The commonest reason cited for non-compliance was side effects (26.3%) of anti-glaucoma medications. Other causes included cost factor (19.2%), forgetting schedule (17.7%), depletion of medication before next appointment (14.6%), inability to understand instructions (12.2%) and loss of prescription (4%).

**Conclusion:** Compliance rates were quite poor and were mainly associated with demographic factors, duration and number of drugs.

### Introduction

Glaucoma was probably recognized as a disease entity in the 17<sup>th</sup> Century where the term was derived from the Greek term *glaukoma* meaning cataract or opacity of the lens implying the lack of understanding of this disease process.<sup>(1)</sup>

The concept of glaucoma has been further refined, particularly over the last 100 years. Dr. Drance in 1973 provided for the first time the definition of glaucoma as a disease of the optic nerve (an optic neuropathy) caused by numerous factors, called risk factors.<sup>(1)</sup>

It is estimated that there are more than 60 million cases of glaucoma worldwide and it will increase to 80 million by 2020.<sup>(2)</sup> The estimated prevalence of glaucoma is 2.65% in people above 40 years of age. Globally, primary open-angle glaucoma (POAG) is more prevalent than primary angle closure glaucoma (PACG) and responsible for around three fourth of all glaucoma cases. Overall glaucoma is the second major cause of blindness after cataract and refractive errors. It is estimated that more than 3 million people world wide are blind due to glaucoma.<sup>(3)</sup>

The blindness caused for this disease is irreversible<sup>(4)</sup> being possible to prevent it through drug treatment with the use of eye drops or surgical intervention. Normally, the first line of treatment is the drug therapy.<sup>(5)</sup>

The success of the therapeutic drug depends strictly on the patient's compliance, that is, on the correspondence of patient's behavior when using the medicines, with the medical recommendations.<sup>(6)</sup> The lack of fulfilment to the drug treatment can culminate with the patient's vision loss.<sup>(7)</sup> This is a worrying fact, as Patel & Spaeth had found 59% of noncompliant patients. Some authors<sup>(8)</sup> have found possible intervening factors for noncompliance to anti-glaucoma therapy, with quite changeable results.<sup>(8,9,10,11)</sup>

Studies have shown a correlation of non-compliance with age, race, sex, number of medications, agility of patients, and communication between doctors and patients.<sup>(12-16)</sup> Other studies have proposed that the perception of side effects and negative attitudes to the treatment are major reasons for non-compliance. Non-compliance with glaucoma therapy has been reported to range from 20% to 58%.<sup>(17-20)</sup>

The aim of our study was to investigate the level of compliance with glaucoma medications in a clinical setting of a tertiary north Indian hospital amongst both rural and urban patients and the factors associated with failed compliance. Thus to improve patient care and reducing visual deterioration and loss from glaucoma.

## Method

This was a Cross sectional study done at the Glaucoma Clinic, Indira Gandhi eye hospital and research centre Lucknow, between October 2014 and March 2015. All patients were examined to make sure they met the inclusion and exclusion criteria. a thorough ocular examination, including visual acuity, IOP measurement, and slit-lamp and fundal examination, was performed and then a standard questionnaire was filled for each patient by direct questioning and also from case records. Impact of age, gender, place of residence, religion, education, social status, knowledge about disease, systemic illness, other medical treatment, duration of treatment and number of anti-glaucoma medication on compliance was evaluated. Data was analyzed using SPSS version 15.0. Data has been represented as numbers and percentages. Associations were evaluated in terms of odds ratio and tested using chi-square.

## Results

Out of 198 patients enrolled - 30.8% were females, 30.8% were in the age group of 61-70 yrs age group, 60.1% had an urban background, 73.3% were aware that they had glaucoma and 66.7% were under treatment for more than 2 years.

Although rate of compliance varied among different age groups ranging from 0 to 34.4% yet this difference was not significant statistically ( $p=0.072$ ).

The odds of compliance (Table 1) were higher ( $OR>1$ ) among females as compared to males, urban as compared to rural, Hindus as compared to Muslims, 12<sup>th</sup> Class/ Graduates as compared to Uneducated/ Primary educated, Higher socioeconomic strata as compared to other socioeconomic strata, those having knowledge about disease as compared to those not having knowledge about disease, having shorter duration ( $<2$  years) of disease and those taking single AGM as compared to those taking multiple drugs (Fig. 1), however, this difference was significant statistically only for place of residence, education, social status, duration of treatment and number of AGMs only ( $p<0.05$ ).

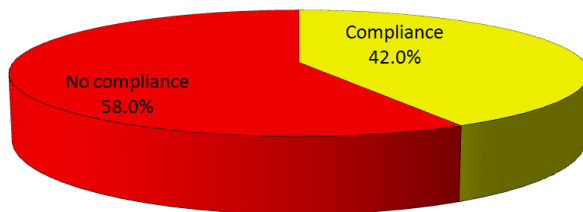
**Table 1: Association of demographic & clinical factors with compliance**

SN	Factor	Total No.	No. compliant	% Compliance	Significance of association
1.	Gender				$\chi^2=1.328$ ; $p=0.249$ (NS)
	Male	137	28	19.0	
	Female	61	16	26.2	
2.	Place of residence				$\chi^2=7.584$ ; $p=0.006$ (S)
	Rural	79	9	11.4	
	Urban	119	33	27.7	
3.	Religion				$\chi^2=2.710$ ; $p=0.100$ (NS)
	Hindu	174	40	23.0	
	Muslim	24	2	8.3	
4.	Education				$\chi^2=17.950$ ; $p<0.001$ (S)
	Uneducated	58	4	7.1	
	Primary	29	2	6.9	
	12 <sup>th</sup> Class	45	15	33.3	
	Graduate/PG	68	21	30.9	
5.	Social strata				$\chi^2=17.237$ ; $p=0.002$ (S)
	High	40	18	45.0	
	Medium	49	8	16.3	
	Low	26	3	11.5	
	Very low	33	5	15.2	
	Unemployed	50	8	16.0	
6.	Knowledge about disease				$\chi^2=5.120$ ; $p=0.024$ (S)
	No	153	27	17.6	
	Yes	45	15	33.3	
7.	Systemic disease				$\chi^2=0.225$ ; $p=0.635$ (NS)
	Yes	96	19	18.6	
	No	102	23	22.5	
8.	Medical treatment				$\chi^2=2.170$ ; $p=0.141$ (NS)
	Yes	76	12	15.8	
	No	122	30	24.6	
9.	Duration of treatment				$\chi^2=11.015$ ; $p=0.001$ (S)
	<2 Yrs	66	23	34.8	
	>2 Yrs	132	19	14.4	
10.	No. of AGMs				$\chi^2=31.150$ ; $p<0.001$ (S)
	Single	45	23	51.1	
	Multiple	153	19	12.4	

The commonest reason cited for non-compliance was side effects (26.3%) of anti-glaucoma medications. Other causes included cost factor (19.2%), forgetting schedule (17.7%), depletion of medication before next appointment (14.6%), inability to understand instructions (12.2%) and loss of prescription (4%)(Table 2).

**Table 2: Reasons for Non-compliance**

SN	Reason	No.	%
1.	Instruction not understood	24	12.1
2.	AGM over	29	14.6
3.	Side effects	52	26.3
4.	Forgotten schedule	35	17.7
5.	Cost factor	38	19.2
6.	Lost the prescription	8	4.0



**Fig. 1: Depecting percentage of patients with non compliance**

## Discussion

Noncompliance with medical therapy has long been recognized as an important limiting factor in the medical management of any chronic disease. Patients with glaucoma who have lower rates of compliance are presumed to be at greater risk of developing visual loss.<sup>(21)</sup> Our cross sectional descriptive study was done to investigate the level of compliance with glaucoma medications in a clinical setting of a tertiary north Indian hospital amongst both rural and urban patients and the factors associated with failed compliance.

In our study, we had a high percentage of noncompliance to glaucoma medication 58%(Fig. 1) In literature, noncompliance ranges from 5 to 80% for glaucoma patients.<sup>(22)</sup> Patel and Spaeth reported that 59% of glaucoma patients were not strictly compliant.<sup>(8)</sup> A noncompliance rate of 75.2% was reported among Oman glaucoma population in 2005.<sup>(23)</sup> In our study, higher noncompliance(30.8%) was found in the age group of 61-70 years Although rate of compliance varied among different age groups ranging from 0 to 34.4% yet this difference was not significant statistically ( $p=0.072$ ).

Older patients may have a lower compliance probably due to the lack of family support, reduced vision. In our 60.1% had an urban background, 73.3% were aware that they had glaucoma and 66.7% were under treatment for more than 2 years. The compliance was significantly lower in lower socio economic strata and lower education groups. This data is supported by other studies.<sup>(24-26)</sup> Norell in 1979, Rendell in 2000, and

Okeke et al.in 2009 found that improving knowledge about glaucoma through education significantly improved compliance.<sup>(27-29)</sup> This emphasizes the need to increase glaucoma awareness in the rural population and also the interplay between glaucoma awareness and compliance of drug therapy. Another important association was of higher rate in patients on single anti glaucoma medication as compared of multiple drug combinations which agrees with many studies.<sup>(30-33)</sup>

Analysing the causes of non-compliance we found the commonest reason to be side effects of anti-glaucoma medications. Other causes included cost factor forgetting schedule depletion of medication before next appointment inability to understand instructions and loss of prescription. To improve patient compliance we can employ the following strategies Practical tools and tips like memory aids, appointment reminders, timing and tracking tools. Ideas for drug companies like modification of bottle design to get eye drops consistently and accurately or simply knowing how much liquid is left in the bottle Ways to trigger and support the self-care impulse by highlighting consequences of not treating the disease, using a team approach, enlisting the patient's input and providing educational materials.<sup>(33)</sup>

## Conclusion and Recommendations

Compliance rates were quite poor and were mainly associated with demographic factors, duration and number of drugs.

As we move on from the discovery of the disease called glaucoma back to the 17<sup>th</sup> century to its important role as a cause of blindness in the 19<sup>th</sup> century, to the comprehension of its pathogenesis and treatment in the 20<sup>th</sup> century, its prevention will hopefully be the work of the 21<sup>st</sup> century. To achieve this goal we have to formulate tailor made approaches for patients to individualize treatment ensuring compliance.

## Conflict of Interests

None of the authors have any proprietary interests or conflict of interests related to this paper.

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