

To Investigate Glaucoma Patient's Socio-Demographics and Medication Compliance Issues: Cross-Sectional Study

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Abstract

Aim: To study the Socio demographic profile of glaucoma patients and barriers to treatment compliance.

Methods: This cross-sectional study was carried out in the Department of ophthalmology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 15 months, after taking the approval of the protocol review committee and institutional ethics committee. 100 consecutive patients on medical therapy were included in this study. The patients had been diagnosed as glaucoma, following slit-lamp biomicroscopy, fundus examination using +90 D lens, applanation tonometry, gonioscopy, and perimetry (Humphrey Field Analyzer).

Results: A total of 54 patients were compliant to glaucoma medication. Out of 45 males 20 (44.44%) were compliant and out of 55 females 34 (61.81%) were compliant. ($p=0.185$). On the basis of type of glaucoma, 27 (56.25%) of 48 open angle glaucoma patients, 18 (48.65%) of 37 narrow angle glaucoma patients, 5 (62.5%) of 8 neovascular glaucoma patients and 4 (57.14%) of 7 secondary glaucoma patients were found to be compliant. ($p=0.659$). Among the 100 patients 66 patients were of rural background and 36 (54.55%) of them were compliant to glaucoma medication, while the rest 32 patients resided in urban areas and 18 (56.25%) of them were compliant. ($p=0.949$). On the basis of religion among these 100 patients there were 26 Hindu patients and 74 Muslim patients, among the Hindu patients only 19 were compliant (73%) and 36 were compliant (48.6%) among the 74 Muslim patients. ($p=0.021$). In socio-economic status, 100% compliance was observed with subjects of the upper socio-economic status, 84.62% compliance was observed in the upper middle class, 61.90% compliance in lower middle socio-economic group, 36.36% in upper lower class and 36.36% with the lower socio-economic group. ($p=0.014$).

Conclusion: Compliance to glaucoma treatment is a global problem that needs cooperation of physicians, media, and social care providers. More effort needs to be done by health care providers to educate our patients about the nature of glaucoma, glaucoma susceptibility, and importance of treatment, follow-up visits, and effect of treatment on prognosis.

Keywords: glaucoma, barriers, treatment compliance

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Introduction

Open angle glaucoma is the leading cause of blindness in black and Latino adults and the third leading cause of blindness in white adults[1,3] Intraocular pressure (IOP) lowering is the only proven method of minimizing both the development and progression of glaucoma[4,5] IOP lowering is almost always achieved through eye drop administration. However, adherence to medical therapies is notoriously poor, with reported rates of non-adherence ranging from 30-80%.[6] Poor adherence has been shown to be associated with disease progression and blindness.[7] In order to improve the clinical management of glaucoma, it is critically important to understand the reasons that glaucoma patients do not adhere to their medications. The burden of glaucoma therapy is majorly borne by the government or medical insurances in the developed nations which is not so for the developing countries since there are still very few studies on the cost of glaucoma in these countries. However, it has been observed that developing nations are disproportionately burdened with blindness, with a resulting decrease in productivity and care costs, further limiting the economic resources of these societies. It has been described that financial burden increases with the increase in severity of the disease[8,9] Quality of life, standard of health and comfort, has an inverse association with glaucoma, its resultant visual impairment, and economic burden of its treatment[10,11] It is important to know how much each patient spends on the treatment of their disease and accurately measure the impact on their monthly income in our country. The purpose of this study is to assess the economic burden of long term glaucoma therapy on chronic glaucoma patients with the objectives to inquire regarding socio- economic status of

the glaucoma patients; the number, cost and duration of use of glaucoma medications by these patients and compliance to treatment.

Material and methods

This cross-sectional study was carried out in the Department of ophthalmology, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India, for 15 months

Methodology

100 consecutive patients on medical therapy were included in this study. The patients had been diagnosed as glaucoma, following slit-lamp biomicroscopy, fundus examination using +90 D lens, applanation tonometry, gonioscopy, and perimetry (Humphrey Field Analyzer).

Data was analyzed using SPSS version 21.0. Data has been represented as numbers and percentages. Associations were evaluated in terms of odds ratio and tested using chi-square. Impact of age, gender, type of glaucoma, place of residence, religion, number of drugs used, expenditure distribution, socio-economic status, knowledge about disease and systemic illness on compliance was evaluated.

Results

The study included 100 patients among whom, 45 (45%) were males and 55 (55%) were females. The maximum number of patients were in their 5th to 6th decade of life amounting to 41 (41%). 34 (34%) patients belonged to urban areas and 66 (66%) to rural areas. Out of 100 subjects, 48 patients had primary open angle glaucoma, 37 patients had primary narrow angle glaucoma, 8 patients had neo-vascular glaucoma and 7 patients were with secondary glaucoma.

The socio-economic class distribution of the patients was according to the Kuppaswamy Scale modified in 2018.[13] Maximum number of patients were in the Upper Lower class amounting to 51 patients (51%).

48 patients (48%) were instilling two anti-glaucoma drugs, 23 patients (23%) were instilling one anti-glaucoma drug, 22 patients (22%) were instilling 3 anti-glaucoma drugs and 5 patients (5%) were instilling 4 anti-glaucoma drugs.

46 of 100 patients were spending Rs.1 to Rs.500 on anti-glaucoma therapy, 45 patients were spending Rs.501 to Rs.1000 on anti-glaucoma therapy and 9 patients were spending Rs.1001 to Rs.1500 on anti-glaucoma therapy.

30 patients spending between Rs.501 to Rs.1000 on anti-glaucoma drugs belonged to upper lower class whereas 3 patients belonging to the lower class were spending Rs.1001 to Rs.1500 on anti-glaucoma therapy. ($p < 0.001$). Alpha agonists (76%) were most commonly used by the glaucoma patients overall followed in frequency by beta blockers (56%), carbonic anhydrase inhibitors (44%), pilocarpine (13%) and a prostaglandin analogue (2%). Patients using timolol maleate alone, spent Rs.45-60 per month, prostaglandin analogs costed Rs.150-200 per month, an alpha agonist Rs.140-150 per month, pilocarpine Rs.40-50 per month and those using carbonic anhydrase inhibitors spent Rs.300-350 per month.

A total of 54 patients were compliant to glaucoma medication. Out of 45 males 20 (44.44%) were compliant and out of 55 females 34 (61.18%) were compliant. ($p = 0.185$)

Among the 100 patients 9 patients were in the age group of 31-40 years in which only 4 patients (44.4%) were compliant to glaucoma medication, 21 patients in the age group of 41-50 years among them only 12 were compliant (57.14%), while in the age group of 51-60 years 41 patients were there

and 24(58.54%) were compliant, the age group of 61-70 years consisted of 17 patients and 8 (47.06%) of them were compliant to glaucoma medication, 12 patients were in the age group of 71-80 years and 5 patients (41.67%) among them were compliant to glaucoma medication, In the age group of 81-90 years there was only 1 patient and was compliant (100%) to glaucoma medication. ($p = 0.655$).

On the basis of type of glaucoma, 27 (56.25%) of 48 open angle glaucoma patients, 18 (48.65%) of 37 narrow angle glaucoma patients, 5 (62.5%) of 8 neovascular glaucoma patients and 4 (57.14%) of 7 secondary glaucoma patients were found to be compliant. ($p = 0.659$). Among the 100 patients 66 patients were of rural background and 36 (54.55%) of them were compliant to glaucoma medication, while the rest 32 patients resided in urban areas and 18 (56.25%) of them were compliant. ($p = 0.949$). On the basis of religion among these 100 patients there were 26 Hindu patients and 74 Muslim patients, among the Hindu patients only 19 were compliant (73%) and 36 were compliant (48.6%) among the 74 Muslim patients. ($p = 0.021$).

Based on the number of drugs used by the subjects as their glaucoma therapy, 15 (65.22%) out of 23 using a single drug, 30 (60%) out of 50 using two drugs, 7 (33.33%) out of 21 using three drugs and 2 (33.33%) out of 6 using four drugs were found to be compliant. ($p = 0.365$). Based on expenditure distribution 30 (65.22%) of 46 spending Rs.1-500, 22 (48.89%) of 45 spending Rs. 501-1000 and 2 (22.2%) out of 9 spending Rs. 1001-1500 on glaucoma medication were found to be compliant. ($p = 0.037$)

In socio-economic status, 100% compliance was observed with subjects of the upper socio-economic status, 84.62% compliance was observed in the upper middle class, 61.90% compliance in lower middle socio-economic group, 36.36% in upper lower class and 36.36% with the

lower socio- economic group. (p=0.014). Only 44 patients among the 100 had knowledge of the disease but 32 of them were compliant (72.73%) and the rest 56 patients who did not have any knowledge of the disease, only 22 of them (39.28%) were compliant to glaucoma medication. (p=0.002).

The compliance was higher in patients without systemic disease, 39 patients among the 100 glaucoma patients didn't have any systemic disease and 23 of them were compliant (58.97%), while the rest 61 who were having systemic illness, only 31 of them (50.82%) were compliant to glaucoma medication. (p=0.374).

Table 1: Distribution of patients based on the total expenditure on glaucoma therapy

Expenditure Distribution (in Rs.)	No. of patients	%
1-500	46(X)	46
501-1000	45 (Y)	45
1001-1500	9 (Z)	9

Table 2: Distribution of patients based on socio-economic status in terms of total expenditure incurred by the patients

Socio-Economic Status	X (n=47)	Y (n=44)	Z (n=9)	Statistical significance
UPPER (n=5)	2	0	3	
UPPER MIDDLE (n=13)	9	2	2	
LOWER MIDDLE (n=21)	10	10	1	c ² =38.9; p<0.001
UPPER LOWER (n=50)	20	30	0	
LOWER (n=11)	6	2	3	

Table 3: Association of demographic and clinical factors with compliance

Factor Number	Compliant	% Compliance	Significance of association
Gender			P-value
Male (N=45)	20	44.44	p=0.195
Female (N=55)	34	61.18	
Age			p=0.665
31-40 (N=9)	4	44.4	
41-50 (N=21)	12	57.14	
51-60 (N=41)	24	58.54	
61-70 (N=17)	8	47.06	
71-80 (N=12)	5	41.67	
81-90 (N=1)	1	100	
Type of Glaucoma			p=0.669
POAG (N=48)	27	56.25	
PNAG (N=37)	18	48.65	
Neovascular (N=8)	5	62.50	
Secondary (N=7)	4	57.14	
Place of residence			p=0.949
Rural (N=66)	36	54.50	
Urban (N=32)	18	56.25	
Religion			p=0.031
Hindu (N=27)	20	74.07	

Muslim (N=73)	34	46.57	
Number of Drugs Used			
1 (N=23)	15	65.22	p=0.375
2 (N=50)	30	60.00	
3 (N=21)	7	33.33	
4 (N=6)	2	33.33	
Expenditure distribution (In Rs.)			
1-500 (N=46)	30	65.22	p=0.047
501-1000 (N=45)	22	48.89	
1001-1500 (N=9)	2	22.22	
Socio-Economic Status			
Upper (N=4)	4	100	p=0.015
Upper Middle (N=13)	11	84.62	
Lower Middle (N=21)	13	61.90	
Upper Lower (N=51)	22	43.14	
Lower (N=11)	4	36.36	
Knowledge about disease			
No (N=56)	22	39.28	p=0.003
Yes (N=44)	32	72.73	
Systemic disease			
Yes (N=61)	31	50.82	p=0.384
No (N=39)	23	58.97	

Discussion

Glaucoma being the leading cause of irreversible blindness in India and the fact that there is poor glaucoma awareness among the population and under-implementation of ophthalmic services in the country acts as an add-on to the glaucoma crisis.[14,15] To counter act this situation, compliance of anti-glaucoma medication needs to be incremented. The barriers to compliance for patients with glaucoma are significant.[16]

In the present study 54% subjects showed compliance to glaucoma therapy. The non-compliance rates have been found to be varied in different countries: Israel (29%), [17] Hong Kong (63.4%),[18] Taiwan (75.8%),[19] Saudi Arabia (19.4%),[20] and Pakistan (65.5%). [21] Patel and Spaeth reported that 59% of glaucoma patients were not strictly compliant.[22] A noncompliance rate of 75.2% was reported among Oman glaucoma population in 2005. [23] India being a developing nation with most of the patients without having any

health insurance coverage, cost of the glaucoma medication is a major cause of non-compliance. However, forgetfulness is also one of the leading cause.[24] Lower compliance is usually seen in older patients which could be mostly due to lack of family support and diminished vision,[25] as per data supported by JE Stryker et al in 2010,[26] J Lunnela et al in 2010[27] and S. Deokule et al in 1979.[28] In our study, Out of 45 males 20 (44.44%) were compliant and out of 55 females 34 (61.18%) were compliant. (p= 0.185).

In a study done by Nahla et al.,[29] the female group, 78 patients (54.6%) were found to be compliant. In the male group, 126 patients (42.4%) were found to be compliant. In a study by Kim et al. [30] 68.9% males and 77.0% females were compliant to glaucoma medication.

In our study, higher non-compliance (44.4%) was found in 31-40- and 61-70-years age group. In a study conducted by Tripathi et al.[31] higher non-compliance (38%) was reported in the age group of 61-

7 years. Patients showed good compliance in age group below 50 years (66.17% of compliant patients), while 60.59% of noncompliant group aged above 50 years, in a study done by Nahla et al.[29]

Kim et al.[30] in their study found out that 74.3% normotensive glaucoma, 65.9% angle closure glaucoma and 69.9% open angle glaucoma patients were compliant to glaucoma medication, where as in the present study On the basis of type of glaucoma, 27 (56.25%) of 48 open angle glaucoma patients, 18 (48.65%) of 37 narrow angle glaucoma patients, 5 (62.5%) of 8 neovascular glaucoma patients and 4 (57.14%) of 7 secondary glaucoma patients were found to be compliant. according to Tripathi et al. [31] 60.1% of urban population was compliant with the glaucoma therapy. Compliance to one drug regimen in a study conducted by Misra et al.[32] was 72% which dropped to 24% in two drug regimen whereas Based on the number of drugs used by the subjects as their glaucoma therapy, 15 (65.22%) out of 23 using a single drug, 30 (60%) out of 50 using two drugs, 7 (33.33%) out of 21 using three drugs and 2 (33.33%) out of 6 using four drugs were found to be compliant. ($p=0.365$) Upon analyzing the effect of the level of education upon compliance Nahla et al.,[29] found a statistically and highly significant difference in compliance ($p < 0.0001$) between educated and non-educated patients, with the highest percentage of non-compliant patients (41.5%) falling in the non-educated (illiterate) group and the highest percentage of compliant patients (69.6%) falling in the group who finished high school and university graduates. In our study also, higher compliance was seen with subjects belonging to higher socio-economic status.

The compliance was higher in patients without systemic disease, 39 patients among the 100 glaucoma patients didn't have any systemic disease and 23 of them were compliant (58.97%), while the rest 61 who were having systemic illness, only 31 of them (50.82%) were compliant to

glaucoma medication. ($p=0.374$). In the study by Kim et al.[30] they found out that 70.3% patients with underlying systemic disease and 73.8% patients without any systemic disease are compliant to glaucoma medication.

In our study, only 44 patients among the 100 had knowledge of the disease but 32 of them were compliant (72.73%) and the rest 56 patients who did not have any knowledge of the disease, only 22 of them (39.28%) were compliant to glaucoma medication. ($p=0.002$). In a study by Nahla et al., [29] 46.4 % of the patients who had knowledge about the disease were compliant and 53.6 % of the patients who did not have knowledge about the disease were compliant.

Conclusion

Compliance to glaucoma treatment is a global problem that needs cooperation of physicians, media, and social care providers. More effort needs to be done by health care providers to educate our patients about the nature of glaucoma, glaucoma susceptibility, importance of treatment, follow-up visits, and effect of treatment on prognosis.

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