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Original Research Article

Study of adherence to topical anti-glaucoma therapy in rural India with exploration of adherence barriers

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ABSTRACT

Background: Anti-glaucoma medications form the first line of treatment in glaucoma management. However, the effectiveness of medical management for glaucoma is dented by poor adherence to anti-glaucoma medications. There is a need to elucidate the barriers to anti-glaucoma adherence and address them in order to increase effectivity of glaucoma therapy. This study is an attempt in estimating anti-glaucoma adherence behavior along with understanding various barriers to adherence.

Materials and Methods: This cross-sectional, hospital based study was conducted in District Hospital Kupwara, Kashmir division, India over a period of 2 years from June 2020 to June 2022. 303 consecutive patients who were consented were included in this study. Adherence data was collected using self-reporting method in the form of visual analogue scale and 8-item morisky scale.

Results: 303 patients having glaucoma were included in this study. Mean age of patients was 53.86 ± 8.04 years ranging from 35–70 yrs. On Visual Analogue Scale, 78 percent were adherent while as 22 percent were non-adherent. As per Morisky Scale, 9 percent showed low adherence, 17 percent had medium adherence and 74 percent were having high adherence. Study patients with poor adherence reported many barriers to adherence especially forgetfulness, cost and side effects.

Conclusion: Non-adherence is a significant problem in medical management of glaucoma seen in almost one-fourth of our patients. Educating patients and their caretakers is a must in preventing glaucoma morbidity and associated economic drain.

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1. Introduction

Glaucoma is a common ocular disease typically characterized by: Intraocular pressure>21 mm Hg recorded on at least few occasions, characteristic optic disc cupping and specific visual defects. Glaucoma is the second leading causes of blindness worldwide affecting 78.6 million people.[1] 60% of the world's total glaucoma cases reside in Asia.[2] Recent population-based study suggested that 11.2 million persons aged 40 years and older are affected due to glaucoma in India.[3] In Kashmir, pseudo-exfoliation glaucoma was the largest group (40.25%) of glaucoma patients in a study, 29% had POAG, 7.25% had angle closure glaucoma.[4]

Medical therapy is the starting point for treatment in most glaucomas and aims at reducing the intraocular pressure (IOP) by use of topical and systemic drugs like: beta-blockers, prostaglandin analogues, carbonic anhydrase inhibitors, adrenergic drugs, parasympathomimetics and hyperosmotic agents. These drugs aim at a 24 hour IOP control with minimal fluctuations.

Among other factors, success of medical therapy depends on proper adherence of patients to their medication.[5] WHO defines adherence as "the extent to which a

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person's behavior – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider".[6] One of the major problems in management of chronic diseases including glaucoma is poor compliance to treatment. Poor adherence to treatment with anti-glaucomatous eye drops is a major problem regarding the management of the disease, and ranges from 5% to 80% according to a meta-analysis conducted in 2005.[7] In India, non-compliance can be as high as 50 percent.[8] Non-adherence results in poor therapeutic goal achievement, increased morbidity rates, unnecessary economic expenditure and functional disability. Missing even a single dose of glaucoma therapy can defeat the goal of preventing optic disc damage. Patients with glaucoma having lower rates of compliance are presumed to be at greater risk of developing visual loss.[9] It is estimated that approximately 10% of visual field defects are caused by non-adherence. Non-compliance is a serious problem because in addition to failure of a prescribed therapy, it also negates therapeutic choice, leading clinicians to believe that the therapy is not working. This may lead to prescription of additional medications or surgical interventions, thereby increasing unnecessary risks and costs.

In view of above observations, estimation of adherence takes a foreground in glaucoma management. There are many measurement techniques for adherence. WHO classifies them as subjective and objective measurements.[6] Subjective measurements involve those requiring provider's or patient's evaluation of their medication-taking behavior. Self-report and healthcare professional assessments are the most common subjective tools used to rate adherence to medication.[10] Objective measures directly assess adherence. Objective methods include pill counts, secondary database analysis, electronic monitoring and biochemical measures. Researchers have used pharmacy refill methods, electronic monitoring, and self-report measures to assess the medication adherence of glaucoma patients.[11] In India, electronic dose monitors are not readily available, and pharmacy records are either missing or difficult to procure. Self-reported adherence measures are most commonly used because these are cost-effective and more feasible in assessment of adherence in glaucoma patients. The visual analogue scale (VAS), a self-report measure of adherence, has been validated against prescription medication refills for chronic disease patients.[12] In VAS, patient is asked "All things considered, how much of the time do you use ALL of your glaucoma medications EXACTLY as directed?" and instructed the patient to place a mark through the 100 mm line to indicate their answer (range is 0 mm = None of the time, 100 mm = All of the time). Morisky scale questionnaire is a more elaborate scale, also being easy to administer and score.[13] It helps to identify adherence and explores reasons for non-adherence. It has 8 questions, response choices are Yes/No for questions 1 through 7 and question 8 has a five-point Likert response scale.

Numerous barriers to compliance in anti-glaucoma medication (AGM) exist. These can be classified into provider factors, situational/environmental factors, medication regimen factors, and patient factors.[14] Such barriers are numerous and differ from one set-up to another. Prominent among these barriers are forgetfulness, high cost of medications and side effects. Adherence, a multifactorial complex behavior, is a individual phenomenon with each patient having his/her own set of barriers.

2. Materials and Methods

This study was done to determine the adherence of glaucoma patients to their medication and to evaluate relationship of adherence behavior with patient's demographic data and clinical characteristics. This study also aimed to reveal various barriers to adherence. The present study is a cross-sectional hospital-based observational study. It was conducted in Ophthalmology section, District Hospital Kupwara, Kashmir Division, India over a period of two years from June 2020 to June 2022. 303 consecutive glaucoma patients on medical therapy following up at the glaucoma clinics for at least 2 months were recruited. Inclusion criteria. . . .patients on AGM for at least 2 month and aged over 35 years, who gave informed consent were included in the study. Patients with severe comorbidities directly affecting compliance (e.g. mental retardation, dementia or cognitive restrictions, physical disability requiring relatives help), with language barriers and those with prior ocular surgery were excluded. Drug characteristics were taken for eye with higher dosage in bilateral cases with different therapy in each eye.

Ethical clearance from departmental ethics committee was taken. After taking consent from patients for study participation, questionnaires (consisting of demographical details, morisky medication adherence scale and visual analogue scale) were administered to patients at their follow up visits, before actual consultation, individually in a separate room. Interview was done by the same interviewer for all the participants on a one to one basis in local vernacular. The first author (corresponding author) was the interviewer. The interview started with non-leading questions in an free discussion format to generate consonance and to minimize bias. Stress was placed on the value of precise and accurate information. Participants were also assured that failure to take medication as prescribed; due to personal or economic factors is a common problem. Samples size was calculated assuming compliance to be 50% as previously reported in an Indian study.[8] Accordingly, by using confidence interval of 95% and a margin error of 5% with nonresponse rate of 5%, sample size of 303 was selected for the study.

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams. Chi-square test was employed to determine the association of adherence with demographic variables and clinical characteristics. A P-value of less than 0.05 was considered statistically significant.

3. Results

303 patients having glaucoma were included in this study. Mean age of patients was 53.86 ± 8.04 years ranging from 35–70 yrs. Among study patients, 168 (55.5%) were males and 135 (44.5%) were females. 93 patients were on monotherapy and 210 were on combination therapy. Most patients were on 2 doses per day. Patient data is detailed below in Figure 1 :

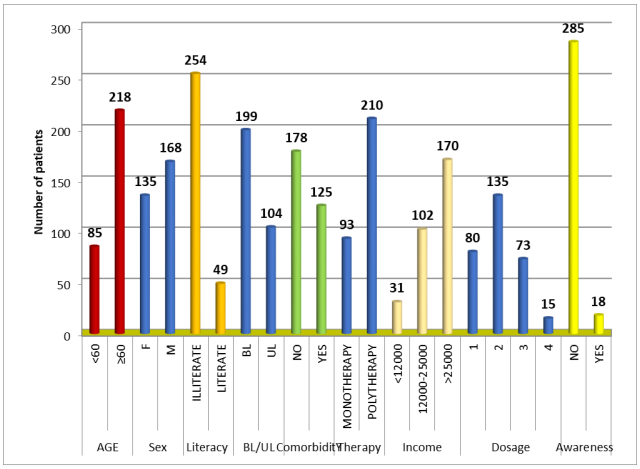

Fig. 1: Demographic and clinical characteristics of study patients

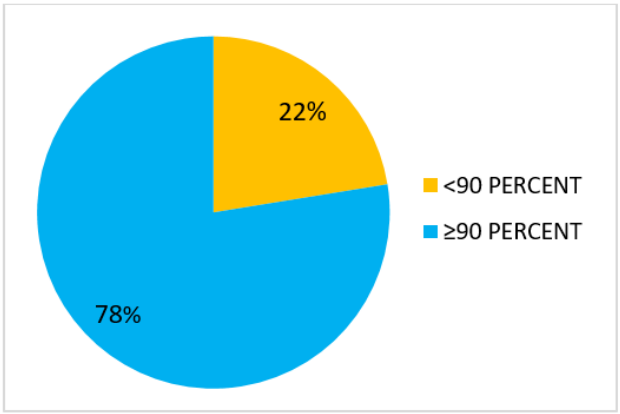

Fig. 2: Demographic and clinical characteristics of study patients

As per visual analogue scale, 22% reported poor adherence (VAS<90%) while as 78% had good adherence (VAS≥90%) as depicted in Figure 2.

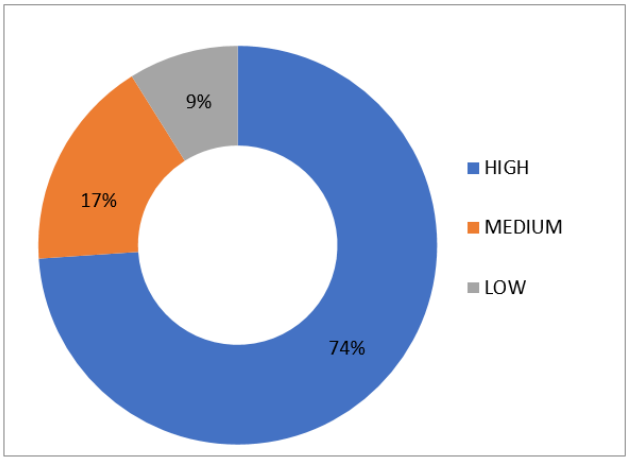

Fig. 3: Adherence as per morisky scale

On the basis of morisky medication adherence scale-8, 9% of study patients had low adherence(score>2), 17% had medium adherence(score 1 or 2) and 74% had high adherence(score 0) as shown in Figure 3.

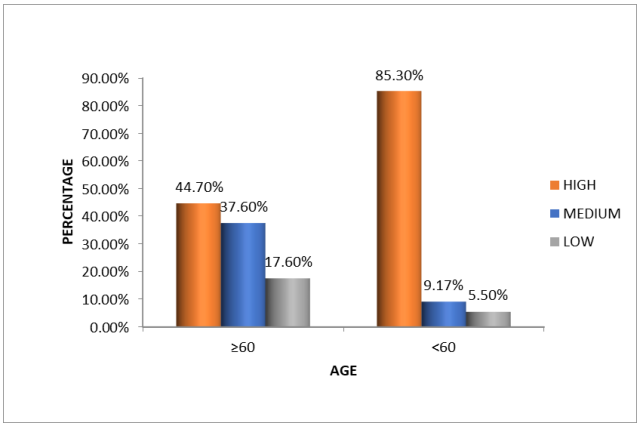

Fig. 4: Relation of age with adherence level

Age had a statistically significant effect on adherence level with younger patients (<60yrs) having better adherence (P value 0.001) as shown in Figure 4.

Females had a higher adherence than males (p value 0.004) with Figure 5 showing the relationship. Almost 85 percent of female patients had high adherence.

As graphically shown in Figure 6, literate people were more adherent than illiterate people (p value 0.007).

Patients with bilateral glaucoma were more likely to adhere to their glaucoma therapy (p value 0.01) as is evident from Figure 7. Two-thirds of patients were having bilateral glaucoma.

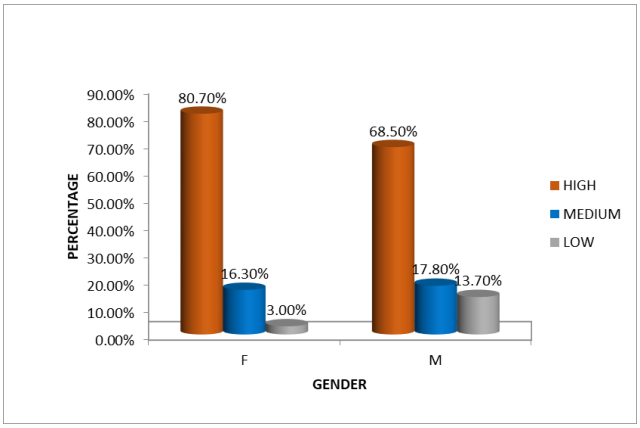

Fig. 5: Relation of gender with adherence level

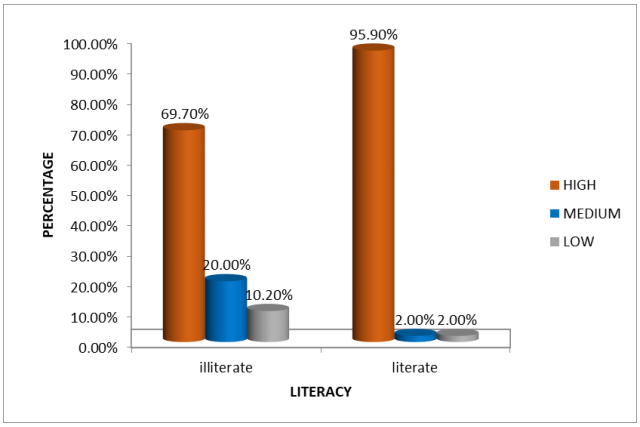

Fig. 6: Relation of literacy with adherence level

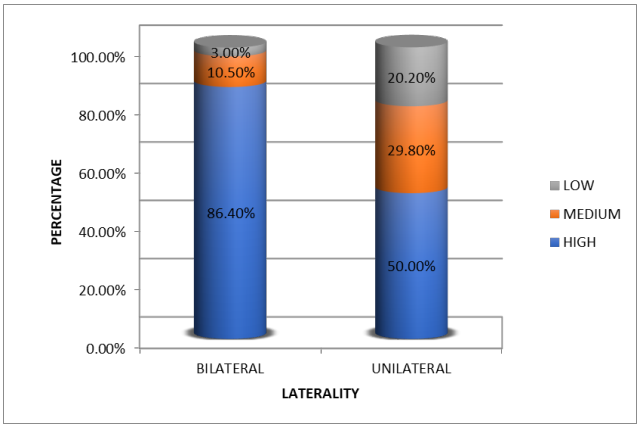

Fig. 7: Relation of laterality with adherence

Co-morbidities had a negative impact on adherence levels of our study patients (P value 0.002), as is further elucidated in Figure 8. Diabetes and hypertension were most common comorbidities.

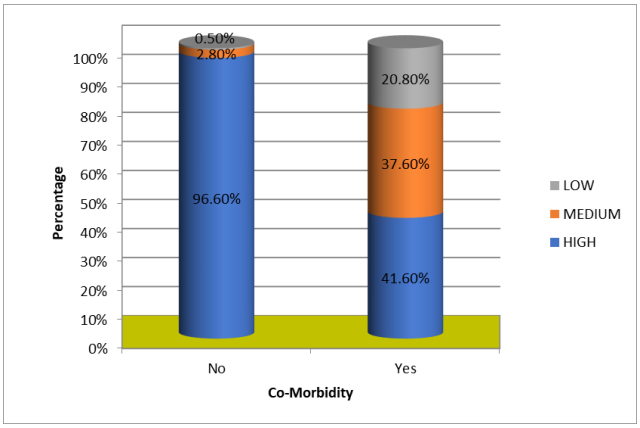

Fig. 8: Relation of co-morbidities with adherence

Of all the dependent variables, monotherapy had most strong statistical relation with adherence. Almost all patients on monotherapy had full adherence (Figure 9). P value 0.0000

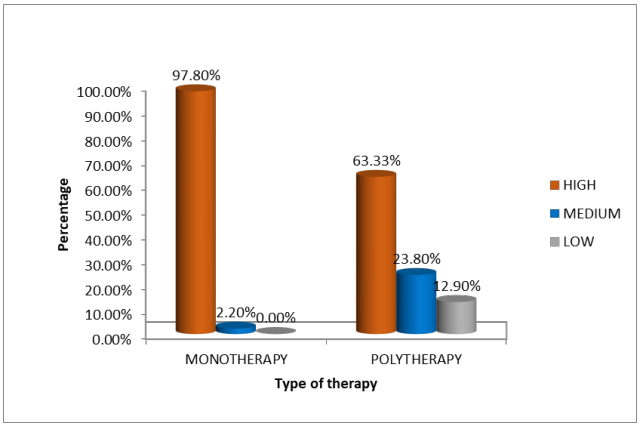

Fig. 9: Relation of type of therapy with adherence

Family income (monthly in rupees) had a positive relationship with adherence as shown in Figure 10. P value 0.04

Glaucoma awareness was not related to adherence as per our study (Figure 11). P value 0.117. It is pertinent to mention that only 18 patients were aware about glaucoma. So the test results may not be reliable.

Barriers to adherence were reported by 79 patients with 22 patients reporting multiple barriers (Figure 12)

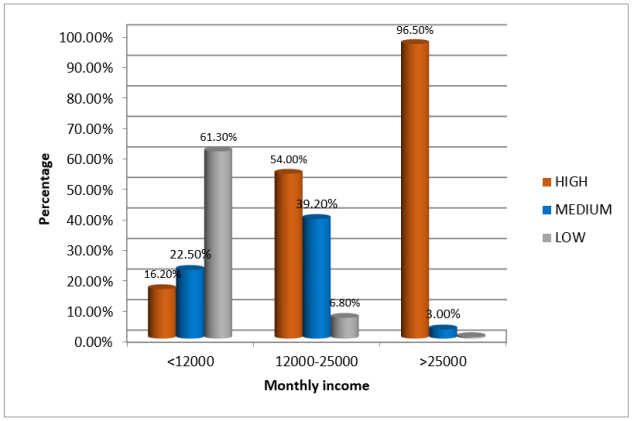

Fig. 10: Relation of monthly income with adherence

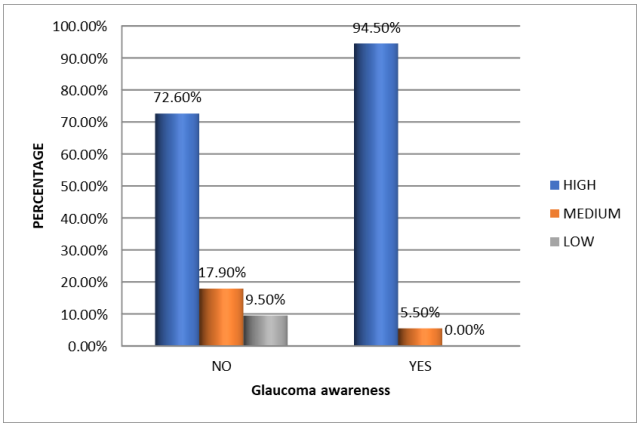

Fig. 11: Relation of glaucoma awareness with adherence

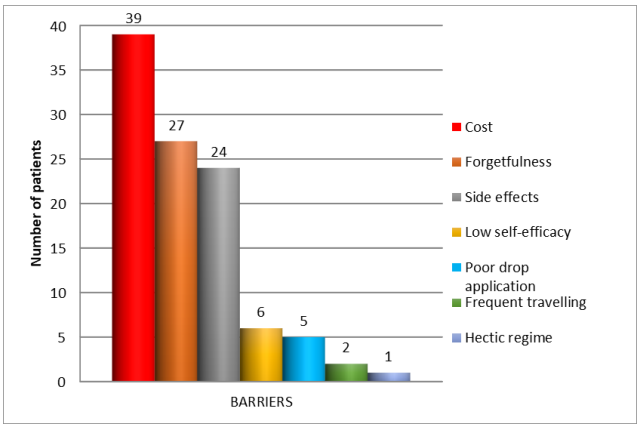

Fig. 12: Barriers to adherence

4. Discussion

Glaucoma, rightly termed as "silent thief of sight" slowly damages the eyes and can cause irreparable damage before there are any symptoms. Glaucoma management comprises of a sizeable expanding armamentarium of therapies, both medical and surgical.[15] A glaucoma clinician, while individualizing treatment regimen, should give due consideration to maximizing adherence in patients. Compared to oral medications, topical medications pose additional challenges. Topical therapy is far more challenging to self-administer. Chronic diseases such as diabetes and glaucoma are typically asymptomatic until the late stages. Without symptoms, the importance of daily adherence may not be realized until late. This is in contrast to diseases where patients are usually immediately symptomatic if they do not adhere to their medical regimen, such as allergies. Many patients expect an improvement in their vision once they start instilling the eye drops. So, it is extremely important to explain to them that the medication is to prevent loss of vision due to the disease process in future and does not improve the current state of vision.

A systematic review has reported that rates of adherence in different studies is 24%–98%.[16] The non-compliance rates in different studies have been found to be varied: North India(49.33%),[17] Egypt (38.2%),[18] Ethiopia(67.5%),[19] Israel (29%),[20] Hong Kong (63.4%),[21] Taiwan (75.8%),[22] Saudi Arabia (19.4%)[23] and Pakistan (65.5%).[24] As is evident, there is a lot of variation in adherence among different studies. In addition to local socioeconomic factors, this may also be due to non-uniform definitions of adherence and different adherence measurement techniques. Consistent with available literature, the non-adherence rate found in this study was 22% on visual analogue scale and 26% on Morisky Medication Adherence Scale-8.

Researches describing the effect of age on adherence to glaucoma medications show conflicting results. Many studies show older age as a risk factor for poor adherence.[23,25] However, Mowatt et al.[26] and Cook et al.[27] in multisite studies reported that patient's demographic variables such as age cannot significantly predict their adherence to glaucoma treatment. Our study showed a positive relation between younger age and good adherence. Younger patients are self dependent who can manage their medications well in contrast to older patients who are dependent on others, frequently have poor drop application and many other ailments to cater to.

Kosoko et al.,[28] Konstas et al.[29] and Shafik et al.[18] reported that males were less adherent than females. Our study found that females have better adherence than males. This can be attributed to the fact that females in our study were home-makers and thus, were more likely to administer medications at proper times.

Factors associated with non-adherence included the use of glaucoma medication requiring more than 2 administrations per day and the presence of multiple other medications in the patient's drug regimen.[28] Once daily dosing regimens are associated with higher rates of adherence than twice or more daily dosing regimens.[29] Monotherapy presents a great ease in medication usage, presenting less interference with daily routine. Mostly monotherapy medications are used at bedtime which is a time when occupational distractions are minimal. Tailoring dosage of therapy to suit the professional and personal demands of the patient, keeping in mind his/her lifestyle helps in ensuring adherence to therapy. Wherever possible, using monotherapy or low dose combination therapy will definitely improve adherence. Our study found a strong relationship between type of therapy and adherence with almost 100 percent of patients on monotherapy reporting high adherence.

Several studies have reported that adequate patient knowledge and understanding of the disease is associated with better adherence to medical treatment.[26,30–33] Surprisingly, in our study, an awareness of glaucoma did not correspond to statistically significant higher adherence rates. This maybe due to low awareness in our study cohort, as only 6% our study patients were aware of glaucoma. This reiterates the fact that there is an immense necessity of promoting glaucoma awareness among common masses.

Numerous studies have been published regarding barriers to anti-glaucoma medications. Most studies have reported following three main barriers: forgetfulness, medication cost and side effects.[14,34–38] Decreased self-efficacy, difficulty instilling drops and difficulties with the medication schedule have also been described.[38] In this era of economic upsurge, most people are busy in productivity vocations encompassing both day and night shifts. Therefore, forgetting medications use is an inevitable phenomenon. Setting up an alarm and/or an automated text reminders can be helpful to improve adherence in glaucoma patients. Medication cost was a significant barrier in our study. Our study was done in a rural area with most patients belonging to low-middle class families. Considering the fact that anti-glaucoma medications especially prostaglandin analogues are expensive, cost factor is a major issue in glaucoma management. It is pertinent to mention that glaucoma therapy is a chronic one, mostly lifelong. With no insurance coverage policy in our setup, there is a urgent need to subsidize glaucoma medications in order to lower their price. Another hurdle in glaucoma adherence is side effects of glaucoma medications. In our study, about 8% of patients attributed poor adherence to side effects. Fortunately most of these side effects are self-limiting or treatable. However, they do cause problems with cosmesis or daily routine of patients. Patients may consider side effects as worsening of their disease. Proper patient selection and appropriate treatment can be helpful in reducing such side effects. Other barriers include complex treatment regime and poor self efficacy. Such barriers can be removed with proper patient information and communication.

5. Conclusion

In our study a relatively high proportion of patients, almost one-fourth, were not adhering to the medications regimen for glaucoma. Combination therapy, male gender and lower income were associated with non-adherence. Eye care providers should be aware of the problem of non-adherence to topical medications. Without addressing this issue of poor adherence, glaucoma management is incomplete.

6. Source of Funding

Nil.

7. Conflicts of Interest

There are no conflicts of interest.

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