

Knowledge, Attitude and Practice in Medical Management of Glaucoma: A Cross-sectional Study from a Tertiary Care Hospital at Uttarakhand, India

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ABSTRACT

Introduction: Glaucoma is most common cause of irreversible blindness in the world. Hence, awareness about the disease, importance of drugs effect and its side-effects and accurate method of eye drop instillation is very crucial.

Aim: To assess Knowledge, Attitude and Practice (KAP) at the medication, doctor and patient level in clinical practice.

Materials and Methods: It was a cross-sectional, descriptive, questionnaire based study conducted at Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, Uttarakhand, India, for duration of two years from July 2020 to June 2022. It included 290 patients diagnosed with glaucoma. They were asked to demonstrate method of instillation of eye drop to assess correct method and to cover a few aspects of questionnaire regarding medication instillation. The statistical analysis was done using Statistical Package for the Social Sciences (SPSS) software version 21.0. The p-value was determined for questions in the questionnaire using Chi-square test. The p-value <0.05 was considered significant.

Results: About 88 (30.34%) patients were educated about the nature and progression of glaucoma. Punctal occlusion was explained to 40 (13.79%) patients and assisted instillation to 25 (8.62%) patients. Approximately 62 (70.45%) patients were educated about their disease. About 244 (84.14%) patients noticed that their ophthalmologist clinic had a television in Outpatient Department (OPD). Family screening was advised in only 67 (23.1%) of the patients. Only 53 (18.28%) patients were emphasised on strict control of associated systemic illness.

Conclusion: Proper patient education about glaucoma and treatment by healthcare provider plays a crucial role. Most of the patients were not educated about method of instillation of drops. Correct instillation of drops was crucial to achieve target Intra Ocular Pressure (IOP), minimising side-effects and reducing the cost of treatment. Family screening and control of associated systemic conditions were often missed by majority of ophthalmologists however, it is important to keep in mind.

Keywords: Awareness, Eye drop instillation, Screening, Topical antiglaucoma medications

INTRODUCTION

Glaucoma is a chronic progressive optic neuropathy, associated frequently but not always with raised IOP. There is plethora of topical medications in the form of eye drops in armamentarium for glaucoma treatment. Several new drugs like Rho-kinase inhibitors are in pipeline showing promising results to lower IOP [1,2]. In spite of this fact, the burden of blindness due to glaucoma in India has increased from 60 million in 2010 to 80 million in 2020 [3]. Previously, there are studies done to see compliance of topical Antiglaucoma Medications (AGM) [4,5]. However, considering the rising graph of glaucoma, it is time to take a pause and reinforce compliance not just at the level of medication but also factors at the patient and doctor level. Awareness and understanding about the disease, its pathogenesis and course helps the patient to be more alert about the disease. A good communication between the treating ophthalmologist and patient explaining the importance of drugs effect and side-effects, proper timings, accurate method of eye drop instillation is very crucial. Apart from treating IOP which is the major modifiable risk factor there are other aspects like associated hypertension, diabetes, migraine, obstructive sleep apnoea, migraine etc. which hasten the disease progression [6-10]. These conditions have to be kept in consideration while treating glaucoma. These facts have been well known, but not being incorporated in day to day practice, especially by comprehensive ophthalmologists. Importance of family screening and controlling co-morbid systemic conditions, which increases optic neuropathy has not been touched in other papers in the literature.

Present study reinforced the need to understand and give appropriate attention to the under looked issue of eye drop instillation. Thus, the aim of study was to analyse the accurate KAP at medication, doctor and patient level, which can play a pivotal role in bringing down the burden of glaucoma.

MATERIALS AND METHODS

It was a cross-sectional, descriptive, questionnaire based study conducted at Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun, Uttarakhand, India, for duration of two years from July 2020 to June 2022. Ethical clearance was obtained from Institutional Ethical Committee (IEC) ECR/710/Inst/ UK/2015/RR-18 (Reference no. SGRR/IEC/43/18) and adhered to the tenets of the declaration of Helsinki. The informed consent of subjects was obtained. The identity of subjects had not been revealed anywhere in the study. All the Coronavirus Disease-2019 (COVID-19) protocols and safety measures were followed during patient handling.

Inclusion criteria: Subjects included the diagnosed cases of primary and secondary open angle glaucoma, primary and secondary angle closure glaucoma, taking treatment in same hospital/elsewhere and administering topical AGM for atleast past one month, subjects who successfully filled the questionnaire and who gave informed consent were included in the study.

Exclusion criteria: Patient using topical AGM for less than one month were excluded (as the few aspects of the questionnaire related to attitude and practice of patients could not be assessed

with such a short duration of treatment), patients not willing to participate in the study were excluded from the study.

Sample size calculation: It is assumed that the prevalence rate of glaucoma is 3.54% from the previous study [11].

Confidence level=95%, Precision (d)=±2.25%, Formula used: $n=(Z^2 \times P \times (1-P))/d^2$, where,

Z_α=Value of standard normal variate corresponding to a level of significance, P=Likely value of parameter, Q=1-P, d=margin of errors which is a measure of precision. With these assumptions the sample size calculated was 260. Finally, 290 patients were taken for study.

The previous works of literature were searched using PubMed and Google Scholar on the available KAP questionnaires. Relevant articles using the search were picked up. All the articles were reviewed by the departmental glaucoma experts and the items for the questionnaire were developed [12-15]. The experts had more than 10 years of experience (clinical, research, and teaching) in field of ophthalmology. After validating the questionnaire by Cronbach coefficient alpha ($r_k \alpha=0.803$), the experts finalised 20 questions, addressing factors related to the patient, medication and physician for the current study. Subjects were asked to respond to the questionnaire drafted.

Study Procedure

In the present study, six aspects in view of knowledge of patients about their disease were considered in the questionnaire. It was enquired whether patients were educated about nature and progression of disease and who imparted this education. Patients were enquired, if they were educated about timing of instillation of drops and correct method of instillation of drops, including punctal occlusion and assisted instillation. Two aspects were assessed to know the attitude of patients regarding their disease. They were enquired, if they understood the nature, progression and effect of disease. They were asked whether or not they understood the importance of method of instillation of drops. Seven aspects were analysed to ascertain the gap at patient level with regard to visits to the treating eye doctor and instilling eye drops. Five questions were included pertaining to practice of treating ophthalmologist.

Patients not carrying their past glaucoma treatment records were asked to show records on subsequent visit. Their record papers were analysed to fill a few responses of questionnaire pertaining to role of clinician in glaucoma diagnosis. After filling the questionnaire, the patients were taken to a designated room in the OPD. The facilities for washing of hands, availability of mirror and couch for lying down or sitting were available. Patients were asked to instill eye drops using a bottle of sterile Carboxy Methyl Cellulose (CMC 0.5%) in either of the eye depending on patient preference. This was done to check the method of instillation of AGM. If the method demonstrated by the patient was wrong, then the doctor demonstrated the correct method of instillation. Firstly, the patients were advised to wash hands properly before instilling drops and then pouring a single drop on retracting the Cul de sac followed by performing punctal occlusion for 10-20 seconds [Annexure].

STATISTICAL ANALYSIS

All the responses were entered on a Microsoft excel sheet (windows 10) and tabulated. Percentages were calculated as (number of response/total number of subjects)×100. The statistical analysis was done using SPSS software version 21.0. The p-value was determined for questions in the questionnaire using Chi-square test. The p-value <0.05 was considered significant.

RESULTS

A total of 290 participants were included in the study as they were able to completely fill the questionnaire. The age of the patients in the study ranged from 18-80 years. There were 125 (43.1%) males and 165 (56.9%) females in the study. The female to male ratio was 1.3:1. Results of study have been tabulated in [Table/Fig-1].

S. No.	Question	Response in number	%	p-value*
Knowledge				
Educated about nature and progression of disease (N=290)				
1.	(a) Yes	88	30.34	<0.001
	(b) No	202	69.66	
Educated by whom (N=290)				
2.	(a) By doctor	211	72.76	<0.001
	(b) By trained staff	79	27.24	
Educated about timing of instillation of drops (N=290)				
3.	(a) Yes	221	76.20	<0.001
	(b) No	69	23.80	
Educated about method of instillation of drops (N=290)				
4.	(a) Yes	65	22.41	<0.001
	(b) No	225	77.59	
Punctal occlusion informed (N=290)				
5.	(a) Yes	40	13.79	<0.001
	(b) No	250	86.21	
Assisted instillation informed (N=290)				
6.	(a) Yes	25	8.62	<0.001
	(b) No	265	91.38	
Attitude				
Did you understand your disease as told by your doctor/staff (n=88)				
1.	(a) Yes	62	70.45	<0.001
	(b) No	26	29.55	
Did you understand the importance of method of instillation of drops (n=65)				
2.	(a) Yes	58	89.24	<0.001
	(b) No	7	10.76	
Practice				
Do you visit your ophthalmologist on the dates advised (N=290)				
1.	(a) Yes	179	61.72	<0.001
	(b) No	111	38.28	
Do you follow the proper timing of instillation of eye drops as explained by your ophthalmologist (n=221)				
2.	(a) Yes	154	69.68	<0.001
	(b) No	67	30.32	
Do you perform punctal occlusion (n=40)				
3.	(a) Yes	9	22.5	<0.001
	(b) No	13	32.5	
	(c) Sometimes	18	45.0	
How frequently do you miss your drops (N=290)				
4.	(a) Once a week	22	7.59	<0.001
	(b) Once in 15 days	179	61.72	
	(c) Occasionally	89	30.69	
How frequently do you get your IOP checked (N=290)				
5.	(a) Monthly	24	8.28	<0.001
	(b) 3 monthly	163	56.21	
	(c) 6 monthly	47	16.21	
	(d) Yearly	12	4.14	
	(e) Not regular	44	15.16	
Were you asked to demonstrate the method of instilling drops (N=290)				
6.	(a) Yes	40	13.79	<0.001
	(b) No	250	86.21	
Method of eyedrop instillation (N=290)				
7.	(a) Self instillation	218	75.17	<0.001
	(b) Assisted instillation	50	17.24	
	(c) Mixed	22	7.59	

Role of clinician				
1.	Does your doctor has a television in OPD (N=290)			
	(a) Yes	244	84.14	<0.001
	(b) No	30	10.34	
	(c) Didn't notice	16	5.52	
2.	Does your ophthalmologist run any educative video about eye disease in his/her clinic/hospital (n=244)			
	(a) Yes	20	8.20	<0.001
	(b) No	224	91.80	
3.	Family screening advised (N=290)			
	(a) Yes	67	23.10	<0.001
	(b) No	223	76.90	
4.	Systemic illness considered and emphasised to control (N=290)			
	(a) Yes	53	18.28	<0.001
	(b) No	237	81.72	

[Table/Fig-1]: Showing knowledge, attitude and practice of the subjects.
*Chi-square test

In the present study, six aspects in view of knowledge about their diseases were considered in the questionnaire, only 88 (30.34%) patients were educated about the nature and progression of glaucoma. About 65 (22.41%) patients were educated about the correct method of instillation of eye drops and 221 (76.20%) were aware that timing of instillation of eye drops has a role to play. About 211 (72.76%) confirmed that knowledge about glaucoma was given to them by the ophthalmologist. Regarding the correct method of instillation of eye drops, punctal occlusion was explained by the treating doctor to 40 (13.79%). About 25 (8.62%) had information regarding assisted instillation of AGM. Approximately 70.4% patients (62 patients out of 88 patients, who were educated about their disease) understood about glaucoma when they were informed by doctor or staff. 89.24% patients (58 subjects out of 65 patients, who were explained about correct method of instillation) had understanding about importance of correct method and appropriate timing of instillation of eye drops. Rest of the subjects neither did understand nor bothered to ask again.

In the study, 179 (61.72%) patients visited the treating ophthalmologist on advised dates. In the present study, out of 221 patients who were explained about the importance of timing of instillation of eye drops, 154 (69.68%) patients were instilling eye drops as advised. Out of those 40 patients in knowledge, who were educated about punctal occlusion, 13 (32.5%) were not performing it while instilling the antiglaucoma eye drops and 9 (22.5%) performed punctal occlusion each time. In present study, 22 patients (7.59%) missed their antiglaucoma eye drops once a week.

Out of total 290 patients, only 40 (13.79%) were asked to demonstrate the correct method of instillation of drops on subsequent visit to their ophthalmologist. On discussing about the method of instillation of AGM, it was found that 218 (75.17%) were self-administering drops, 50 (17.24%) were assisted by some care giver for instilling eye drops and rest 22 (7.59%) were instilling eye drops sometimes by themselves and sometimes by assisted method, depending on availability of helper. In the study, 24 patients got their IOP checked every month, 163 patients three monthly; 47 patients six monthly and 12 patients yearly, respectively. The study showed that 44 patients were getting IOP checked at random interval as per their convenience. On observing the patients while instilling eye drop in dedicated examination room, various difficulties faced by patients in instilling eye drops in decreasing order included extra drop expression in 73%, eye-tip touch in 61%, dose forgetfulness in 43%, difficult targeting in 34%, difficult squeezing in 29% and difficult capping in 19% patients.

Five questions were included in questionnaire to find out the practice methodology of ophthalmologist in diagnosing and

treating glaucoma. About 244 (84.14%) patients noticed that, there was a television installed in waiting area of their ophthalmologist's clinic. However, out of those 244 subjects, only 20 (8.2%) patients stated that educative video about eye diseases were played on television. The investigations which were used to make diagnosis of glaucoma as seen in patient's records in the study included IOP in 100% patients, slit lamp examination in 100%, fundus examination in 87%, Optical Coherence Tomography (OCT) in 77%, perimetry in 32% and gonioscopy in 10% patients, respectively. Only 23% patients (67 patients) were told about the importance of family screening. Family screening was missed in 223 (76.90%) of the cases in present study. In the present study, 53 (18.28%) patients were informed about their systemic illness and its relation to occurrence of glaucoma and its control. Nearly 237 (81.72%) patients in present study were not being paid attention to related co-morbid systemic illness.

DISCUSSION

Various treatment modalities are available for the treatment of glaucoma; topical AGM being the first line therapy, followed by laser or surgical treatment in specific cases [16]. With the effective use of medical therapy, vision loss in patients with glaucoma can be prevented [17]. The three important constituents of a successful topical pharmacotherapy are adherence, persistence and correct administration of eye drops by the patients [18]. However, this is possible only, if the patient is inclined towards treatment. Patient motivation is possible through proper education, which requires a good counselling from the healthcare provider. Thus, it is important to reconsider the loop hole at each level in our day to day clinical glaucoma practice.

In present study, only 30.34% patients were educated about glaucoma, which was low as compared to one of the study where 98% of the patients had knowledge about the disease [19]. The reason for high prevalence in referred study was because the patients were dealt by glaucoma specialist, who naturally emphasises more on the disease as compared to patients treated by comprehensive ophthalmologist in present study. India is a country, where glaucoma is treated by general ophthalmologist as much as by glaucoma specialists. In the present study, out of those who were educated about the disease 89.24% understood what condition they were dealing, but 10.76% till failed to understand in the first visit. Thus, it indicates that the patients should be reinforced and educated about the disease on every visit or atleast frequently, if time constraints are there due to high patient load.

The patient compliance increases, if he/she understands the silent nature of disease progression. In present study, mostly the treating ophthalmologist educated the patient about the disease, the importance of the correct method and appropriate timing of instillation of eye drops. In few cases, trained staff imparted the knowledge. Educating and motivating the glaucoma patients to instil timely eye drops is a very crucial but on the other hand very tedious task. It involves cooperation and judicious time of treating doctor. As there is more patient load on the doctor, so meticulously training their staff to spend time with the patient, explaining them disease nature and course is also a good alternative for the doctor. This will reduce burden and thus, enhancing the efficiency of the doctor, without compromising the purpose to bridge the education and motivation gap.

In present study, punctal occlusion was informed to only 13.79% patients. Out of those informed only 22.5% (9 patients) performed it every time. Large proportion (13 not performing punctal occlusion at all and 18 sometimes doing punctal occlusion) despite being informed didn't practice it. Similar observation was seen in study by Gupta R et al., which concluded that nearly out of 10 people were not able to instil the eye drop correctly [20]. Punctal occlusion causes the drug to remain for a longer duration in the eye. So,

its effect lasts longer thus reducing IOP effectively. Also, the drug does not reach systemic circulation, thereby reducing side-effects. In some studies, correct method of instillation of eye drop was not explained to the patients [21,22]. Studies suggest that there should be more education of eye drop instillation technique [20,23]. Compliance is better ensured, if they are told about side-effects beforehand as few patients discontinue eye drop because of side-effects like hyperaemia and grittiness [24].

In the present study, 75% patients were administering eye drops by themselves. Common issues reported by patients in the study included extra drop expression, difficult targeting, difficult squeezing, eye tip touch, difficult capping and forgetting doses. Similar problems have been addressed in other studies too [25,26]. Touching the eye and lid with the tip of bottle is a problem, as it may be a source of contamination of bottle [27-29]. Cost of AGM is an important hindrance in long-term compliance. Moreover, proper usage of drops may be pocket friendly to the patient. To minimise all these difficulties, patients should be demonstrated about the correct method of instilling eye drops. For proper implementation of this practice, patient should be reinforced by asking to demonstrate the method at every subsequent visit [30].

A few percent, 8.62% of subjects had knowledge about assisted eye drop instillation in present study. Glaucoma, once diagnosed puts a physical, mental, financial and social burden too. Based on patient's age, visual status, general health, cognition and comprehensive level, the concept of assisted instillation of eye drop has been widely recommended and followed [31]. Therefore, family members should be motivated to support the patient in dealing with the disease. Accompanying attendant should be encouraged during counselling sessions to assist in instillation of eye drops. Large number of studies has shown faulty practice of self instillation of eye drop [20,25,32,33]. While many patients claiming to have no difficulty in instilling drops are often unaware of faulty techniques [25]. A study has clearly stated that 10% glaucomatous blindness was due to poor compliance [34]. Faulty instillation of eye drops may result in failure to reach target IOP. This therapeutic under-effect leads to addition of add-on eye drops. It adds up to the local and systemic side-effects as well as cost of treatment [35]. Thus, present study highlighted the importance of repeated demonstration of method of instillation of topical AGM at each visit.

Other important determinant of compliance of AGM included skipping of drop. The frequency of missing eye drops was variable in the present study. These have been reported in previous studies also [19,27]. Poor compliance results in therapeutic failure. In present study, 61.7% patients visited ophthalmologist on the dates advised for follow-up, thus estimating the compliance of patient. Proper counselling, education and reinforcement at every visit are crucial for ensuring regular and timely follow-ups.

Education could be spread by newspapers, radio, or educative videos [36]. It has been observed in present study as well as day to day OPD visits in various clinics that most of the setups had television (TV). It generally displays entertainment videos for time pass of waiting patients. Educative videos about eye diseases should be encouraged in OPD through television sets. A lot of myths can be eliminated through education especially in our society and country where myths are readily and powerfully accepted.

There are many subsets of investigations which are performed in glaucoma patients. IOP measurement, slit lamp examination and dilated fundus examination were one in almost all the cases in which glaucoma is suspected. As illustrated in the present study, gonioscopy had been done in 10% patients only. Gonioscopy should be done in all suspected and established glaucoma cases. It is a helpful tool in diagnosing secondary glaucoma such as following blunt trauma which is often missed during routine glaucoma work-up due to incomplete history. Performing gonioscopy requires good

expertise on part of clinician and is not patient friendly. Thus, it is easily skipped during examination for making diagnosis by general ophthalmologist. Though basic and essential, yet its importance is fading off in clinical practice. Gonioscopy as an OPD procedure should not be underestimated [37].

Glaucoma is a disease that runs in families [6]. First degree relatives are most commonly affected [7]. Open angle glaucoma is more common, so majority of patients are asymptomatic. Therefore, hidden cases need to be identified to decrease the burden of disease. Thus, family screening plays a very pivotal role in this regard. However, it missed in 77% of the cases in present study.

Systemic control of associated illnesses is an underestimated but a key for proper control of IOP. The risk factors contributing to glaucoma include hypertension, diabetes mellitus, cardiovascular disease, migraine, obstructive sleep apnoea, etc., [6-10]. So, not only treating the eye, but treating the whole body is also an essential prerequisite for controlling optic neuropathy in glaucoma. Most of the cases, nearly 81.72% patients in present study were not being paid attention, to related co-morbid systemic illness. Thus, special emphasis is to be made in controlling those relatable factors that influence the management of glaucoma.

Limitation(s)

Patient's compliance to drops was assessed using a questionnaire, so the response was subjective. In addition, bias may have been introduced as patient tends to be more cautious, while instilling drops in presence of a doctor in the examination room. Education level of the patient was not taken into account, which might have a role to play in the better understanding and compliance towards AGM and disease as a whole.

CONCLUSION(S)

In the present study only 30.34% patients were educated about the nature and progression of glaucoma. About 70.45% patients understood about glaucoma, when they were informed by doctor or staff, 69.68% patients were instilling eye drops as advised. Only 23.10% patients were told about the importance of family screening. Proper method and timely instillation of drops is crucial to achieve target IOP, minimising side-effects, retarding optic neuropathy and reducing the cost of treatment.

Prospectively an extensive assessment of comprehensive ophthalmologist's and ophthalmologist practicing glaucoma as a speciality can be done regarding the knowledge and attitude of the disease, which will surely be beneficial to bring out shortcomings in the practice.

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[ANNEXURE]

Name-

Age/gender-

Duration of disease- duration of disease was noted as we have taken only those patients who have been taking topical eye drops for more than a month. We have not analysed the duration of disease, as it is not a part of any aspect of knowledge, attitude or practice

Type of management- medical/surgical/both/laser:

Family history-

Systemic illness

We have not analysed the demographic and clinical aspects of patients. These questions were asked for completion of patient data only. Questions following ahead this section have only been analysed.

Knowledge

1. Educated about nature and progression of disease
 - (a) YES
 - (b) NO
2. By whom
 - (a) BY DOCTOR
 - (b) BY TRAINED STAFF
3. Educated about timing of instillation of drops
 - (a) YES
 - (b) NO

4. Educated about method of instillation of drops
(a) YES (b) NO
5. Punctal occlusion informed
(a) YES (b) NO
6. Assisted instillation informed
(a) YES (b) NO

Attitude

1. Did you understand your disease as told by your doctor/staff (a) YES (b) NO
2. Did you understand the importance Of method of instillation of drops (a) YES (b) NO

Practice

1. Do you visit your ophthalmologist on the dates advised
(a) YES (b) NO
2. Do you follow the proper timing of instillation of eyedrops as explained by your ophthalmologist
(a) YES (b) NO
3. Do you perform punctal occlusion
(a) YES (b) NO (c) SOMETIMES (d) MOSTLY
4. How frequently do you miss your drops
(a) once a week
(b) Once in 15 days
(c) Occasionally
5. How frequently do you get your IOP checked
(a) monthly
(b) 3 monthly
(c) 6 monthly
(d) yearly (e) not regular
6. Were you asked to demonstrate the method by which you are instilling drops (a) YES (b) NO
7. Method of eyedrop instillation (a) self instillation (b) assisted instillation (c) mixed

Role of clinician

1. Does your doctor has a TV in OPD
(a) YES (b) NO (c) didn't notice
2. Does your ophthalmologist run any educative video about eye disease in his/her clinic/hospital
(a) YES (b) NO
3. What all investigations were used to make diagnosis
(a) IOP
(b) Fundus
(c) Perimetry
(d) Gonioscopy
(e) Slit lamp examination
(f) OCT
4. Family screening advised
(a) YES (b) NO
5. Systemic illness considered and emphasised to control
(a) YES (b) NO