

# Eye drop instillation, a skill to be taught?

Shantala Arunkumar<sup>1</sup>, Bhramaramba Banagar<sup>2</sup>, Chanda<sup>3</sup>

<sup>1</sup>Professor, Department of Ophthalmology, <sup>2</sup>Resident, Department of ophthalmology

<sup>3</sup>Resident, Department of ophthalmology

S. S. Institute of Medical Sciences & Research Centre, Davangere, Karnataka

[Received: 15/11/2014, Revised: 30/11/2014, Accepted: 10/12/2014]

## ABSTRACT

Multiple factors influence patients' adherence to topical ophthalmic medications. The method of eye drop administration, including the handling, storing, is an important factor that is often overlooked.

This study was conducted to evaluate the practice of eye drop instillation by patients

**Methodology:** 253 cataract surgery patients over the age of 19 years were interviewed during their post operative follow up with a set of questions by junior residents to evaluate the practice of eye drop instillation by patients.

**Results:** Mean age of participants was 61.5 years (SD, 5.1 years) and 59.8% were females. 17% of them relied on others for the administration of drops. 16% reported "rarely" or "never" washing their hands prior to handling eye drops. 5% reported "always" or "usually" having the dropper tip touch the eye during administration. Most patients used both hands to apply an eye drop.

**Conclusion:** Although most individuals may have little difficulty with the use, storage, and handling of eye drops, this study demonstrates that there exists a broad variation in the way patients instill eyedrops. This finding suggests that patients need to be taught the skill of eye drop administration to overcome the methodological problems and to improve compliance, and increase efficacy.

**Key-words:** Topical medication, cataract

## Introduction :

Cataract is a global health problem and a leading cause of treatable blindness that affects millions of people worldwide, particularly in developing countries.<sup>1,2</sup> Postoperative complications in these patients and intervention to prevent the same are reported.<sup>3,4</sup> Postoperative care following cataract extractions commonly involves the administration of antibiotic and anti-inflammatory steroid-based eye drops. This can help to prevent infection and cystoid macular edema, as well as controlling intraocular inflammation and pain.<sup>5,6</sup>

Topical antibiotics are the international standard of care following cataract surgery.<sup>7,8</sup>

Medicated eye drops containing dexamethasone, such as the treatment used in this study, are commonly used internationally to control postoperative inflammation and prevent infection.<sup>9</sup> Improper administration of postoperative eye drops can increase the risk of ocular infection.<sup>10</sup> The purpose of this study was to evaluate the efficacy of postoperative patient instruction on the proficiency of eye drop instillation following cataract surgery, and to determine whether such proficiency correlates with the prevalence and/or duration of

irritation and pain experienced by patients postoperatively.

## Methodology :

This study was conducted from department of ophthalmology, SSIMS&RC. participants for the study were postoperative, cataract surgery patients over the age of 19 years. Subjects were from non urban population, whose cataract surgery was conducted under District Blindness Control Society camp. 253 subjects participated in the study, conducted over a period of two months; All participants enrolled in the study received treatments usual for cataract extraction, including a standard postoperative educational session from the junior residents. In patients where self-administration of eye drops was unmanageable, relatives who accompanied the patients were given the eye-drop administration tutorial. 253 patients were interviewed after oral consent taken at the time of their regularly scheduled clinical visit. Junior residents asked demography and a combination of 10 multiple-choice and open-ended questions about patients' use of eye drops.

## Correspondence:

**Dr. Shantala Arunkumar**

Professor, Department of ophthalmology

Mobile: 9741184822 Email : annichiru2015dvg@gmail.com

Access this article online

Website : [www.jermt.org](http://www.jermt.org)

Quick  
Response  
Code :



**Results :** Mean age of study participants was 61.5 years (SD, 5.1 years). There were 59.8% females and 40.2% male. Results for selected questions are summarized in [1](#). Majority (208, 82.6%) of the 253 participants reported administering their own eye drops. Forty-four patients (17.4%) were dependent on others for eye drop administration. The reasons for this dependency were inadequate vision (25%), problems with manual dexterity (25%), and trouble getting only one drop out of the bottle (25%).

**TABLE 1-Results of questionnaire study**

Are the eye drops self-administered?	
Yes	82.6%
No	17.4%
In what position are you when the drops are administered?	
Standing	36.4%
Sitting	37.8%
Lying down	31.6%
Varies	8.1%
Is a mirror used for drop administration?	
Yes	16.3%
No	83.7%
At home, what room is generally used for drop administration?	
Bedroom	69.8%
Kitchen	16.1%
Living room	12.7%
Other	5.4%
Do you wash your hands before drop administration?	
Always	36.4%
Usually	28.7%
Sometimes	19.1%
Rarely or never	15.8%
Does the dropper tip touch your eye?	
Always or usually	4.8%
Sometimes	74.6%
Rarely or never	20.6%
In which hand do you hold the dropper?	
Right	87.4%
Left	12.6%
Do you use fingers to hold open the lids?	
Yes	79.7%
No	20.3%
Which lids are held?	
Both upper and lower	20.0%
Upper only	9.7%

Lower only	64.2%
No answer	6.1%

36.4% of survey participants reported “always” washing their hands before administering eye drops, and 15.8% reported “rarely” or “never” doing so. Around 5% reported “always” or “usually” having the dropper tip touch the eye during administration.

Most patients used the right hand to hold the dropper bottle and the left index finger to hold the eyelid open. In response to the open-ended question “What do you not like about administering your medications?” many patients described no problems, but common responses also included frustration with difficult-to-handle bottles (14.1%), problems getting the proper dosage into the eye (12.9%), and general dislike of putting eye drops in their eyes (11.2%).

**Discussion :** A commonly overlooked component contributing to noncompliance with eye drop therapy is the method of patients' eye drop administration. The current study begins to address the paucity of data in the literature regarding many of the practical aspects of eye drop administration. Although most participants in this study reported little difficulty with the use, storage, and handling of eye drops, the survey results demonstrate that broad variations in reported practices appear to exist.<sup>12</sup> Preferred techniques for applying eye drops have been described in the literature.<sup>7,8</sup> Fraunfelder has confirmed that variations in technique can have a significant impact on the ocular contact time of a topically applied medication. Contact time is related to a medication's efficacy and potentially to its systemic absorption and adverse events.<sup>7</sup> Maximizing ocular contact time is easily achieved by directing patients to follow these simple instructions: First, grasp the lower eyelid near the margin with the thumb and index finger and pull outward to create a pouch in the lower cul-de-sac. Then, without touching the dropper tip to any ocular structures, position it above the eye by direct visualization. Just before releasing a drop, look upward. Allow the drop to settle by gravity into the lower cul-de-sac before releasing the eyelid.<sup>7</sup>

Education regarding appropriate eye drop utilization is particularly important in areas with low literacy rates and limited formal education. Kholdebarin *et al* have reported that improper administration techniques were associated with the patients' formal education limited to elementary school.<sup>11</sup> Muir *et al* confirmed that subjects demonstrating low literacy levels were less adherent to their glaucoma medications than those with higher literacy levels.<sup>13</sup>

The results of this study highlight multiple avenues eye care providers can use to improve patients' eye drop

administration. First, the variability in patient practices suggests that eye care providers need to first ask patients how they administer medications. In fact, it may be helpful to directly observe patients administering medications. Eye care providers should give better instructions about optimal eye drop administration techniques. For example, several questions in this survey indirectly addressed whether or not patients followed the recommended eye drop procedure. Most seemed to follow something similar to the recommended best practice by holding the lower lid with the index finger of the left hand. It is concerning, however, that 25.4% of participants reported contaminating the dropper tip by touching it to the eye at least sometimes. Similarly worrisome is the admission by 15.8% of participants that they rarely or never wash their hands prior to eye drop administration. The reported practices illustrate deficiencies in patients' understanding of optimal methods of safe and effective eye drop administration. These results are consistent with those of other investigators who find a high rate of eye drop contamination.<sup>9,10</sup> Many nations address this problem by prohibiting eye drop bottles to contain more than approximately a 1-month supply. The results of this survey may better inform both physicians and eye drop manufacturers about ways to better accommodate patient individuality, thereby making eye drop administration easier to remember and eye droppers easier to use. The frequency of dropper contamination and infrequency of hand washing may argue that eyedroppers should be constructed to better protect the tip from contamination.

Alternatively, it may be preferable for eye drops to be supplied in smaller, disposable bottles to prevent prolonged use of a contaminated bottle. Nevertheless, the results of this survey add to a growing body of literature that addresses many of the problems contributing to noncompliance with topical therapy.<sup>13</sup> survey study confirms that eye drop practices can vary considerably from one patient to the next. Some patients even report practicing behaviors, such as contamination of the dropper tip and administering more than 1 drop per treatment, that are potentially harmful. These results agree with other studies in the literature that suggest a need for better instruction in the use of topical eye medications.<sup>9-12</sup>

## Conclusion:

Although most individuals may have little difficulty with the use, storage, and handling

of eye drops, this study demonstrates that there exists a broad variation in the way patients instill eyedrops. This finding suggests that patients need to be taught the skill of eye drop administration to overcome the methodological problems and to improve compliance, and increase efficacy.

## References :

1. Rao GN, Khanna R, Payal A. The global burden of cataract. *Curr Opin Ophthalmol.* 2011;22(1):4–9.
2. Tabin G, Chen M, Espandar L. Cataract surgery for the developing world. *Curr Opin Ophthalmol.* 2008;19(1):55–9.
3. Powe NR, Schein OD, Gieser SC, et al. Synthesis of the literature on visual acuity and complications following cataract extraction with intraocular lens implantation. *Arch Ophthalmol.* 1994; 112(2):239–52.
4. Nordlund ML, Marques DM, Marques FF, Cionni RJ, Osher RH. Techniques for managing common complications of cataract surgery. *Curr Opin Ophthalmol.* 2003;14(1):17–9.
5. Rowen S. Preoperative and postoperative medications used for cataract surgery. *Curr Opin Ophthalmol.* 1999;10(1):29–35.
6. Laurell CG, Zetterström C. Effects of dexamethasone, diclofenac, or placebo on the, inflammatory response after cataract surgery. *Br J Ophthalmol.* 2002;86(12):1380–4.
7. Braich PS, Almeida DR, Hollands S, Coleman MT. Effects of pictograms in educating 3 distinct low-literacy populations on the use of postoperative cataract medication. *Can J Ophthalmol.* 2011;46(3):276–81.
8. Masket S, Steinert RF, Mah FS. Antibiotics in cataract surgery. *Cataract and refractive surgery today.* Available from: Accessed January 10, 2012.
9. Notivol R, Bertin D, Amin D, Whiting A, Kennedy M, Cockrum PC. Comparison of topical tobramycin dexamethasone with dexamethasone-neomycin-polymyxin and neomycin-polymyxingramicidin for control of inflammation after cataract surgery: results of a multicenter, prospective, three-arm, randomized, double-masked, controlled, parallel-group study. *Clin Ther.* 2004;26(8):1274–85.
10. Geyer O, Bottone EJ, Podos SM, Schumer RA, Asbell PA. Microbial contamination of medications used to treat glaucoma. *Br J Ophthalmol.* 1995;79(4):376–9.
11. Kholdebarin R, Campbell RJ, Jin YP, Buys YM. Multicenter study of compliance and drop administration in glaucoma. *Can J Ophthalmol.* 2008;43(4):454–61.
12. Muir KW, Santiago-Turla C, Stinnett SS, et al. Health literacy and adherence to glaucoma therapy. *Am J Ophthalmol.* 2006;142(2):223–6.
13. Fraunfelder FT. Extraocular fluid dynamics: how best to apply topical ocular medication. *Trans Am Ophthalmol Soc.* 1976;74:457–87.

How to Cite this article :

Arunkumar S, Banagar B, Chanda. Eye drop instillation, a skill to be taught? *J Educational Res & Med Teach* 2014;2(2):20-2.

Funding: Declared none Conflict of interest: Declared none