



## Original research

# Compliance to topical anti-glaucoma medications among patients at a tertiary hospital in North India

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## Abstract

**Purpose:** The present study aims to estimate the prevalence of non-compliance and improper drop administration technique among glaucoma patients and describe common obstacles to medication compliance.

**Methods:** A hospital-based cross-sectional study, using standardized questionnaire and direct observation by study personnel was conducted among glaucoma patients aged 18 years and above at a tertiary care charitable eye hospital in North India. 151 consecutive glaucoma patients on medical therapy following up at the glaucoma clinics for at least 6 months were recruited. Non-compliance was defined as missing at-least one drop of medication per week and (or) the inability to accurately describe the medication regimen. Study personnel also assessed drop administration technique during application of eye drops by patients treating ophthalmologist-provided information, including measures of disease stability. Factors such as socioeconomic status, presence of caregiver, and number of medications with their effect on compliance were studied using chi-square statistics.

**Results:** Among 151 patients interviewed, around 49% of patients reported problems in using glaucoma medications, with 16% of them reporting total non-compliance. 35% of patients demonstrated improper drop administration technique. Forgetfulness was cited as the main reason for being non-compliant and had a significant association with non-compliance ( $P = 0.00$ ). Paying patients were more compliant as compared to subsidized patients ( $P = 0.05$ ). Disease was more stable in compliant patients compared to non-compliant patients ( $P = 0.05$ ). No other factor had significant association with compliance ( $P > 0.05$ ).

**Conclusions:** Over 50% of the patients surveyed were non-compliant, and 35% demonstrated improper administration technique. Glaucoma patients should be educated on the importance of compliance and aids that minimize forgetfulness, and delivery systems facilitating the delivery of medications to the eye could be considered to enhance patient adherence.

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**Keywords:** Adherence; Glaucoma; Medication; North India

## Introduction

Glaucoma contributes to 0.6 million disability-adjusted life years (DALYs) or 1.96% of the overall burden of diseases in

India.<sup>1</sup> A recent population-based study using modern techniques for detecting glaucoma suggested 11.2 million persons aged 40 years and older are affected due to glaucoma in India.<sup>2</sup> Around 27.6 million persons were estimated to have some form of primary angle closure disease. Blindness among primary angle closure glaucoma (PACG) patients affects twice the number than those with primary open angle glaucoma (POAG).<sup>2</sup> It is estimated that every eighth individual aged 40 years and over to be affected due to glaucoma or is at risk in the country.<sup>2</sup>

Conflict of interest: None.

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Glaucoma progression is associated with elevated intraocular pressure (IOP), and lowering IOP has been shown to inhibit the progression of glaucomatous optic nerve damage.<sup>3</sup> Topical medications are an effective initial therapy in many patients, but studies have shown that it is often necessary to use multiple topical medications to achieve target IOP. However, a complicating factor to glaucoma treatment is that a large population of patients has been shown to have poor compliance. In a study in South India, 42% of the patients reported one or more problems in using their glaucoma medications, and around 6% of patients reporting less than 100% adherence to their medications during the week before.<sup>4</sup>

Various barriers to glaucoma treatment compliance exist, and these can be categorized into provider factors, situational/environmental factors, medication regimen factors, and patient factors.<sup>5</sup> Glaucoma medication compliance can be determined using self-report, physician report, direct observation, electronic medication monitors, and pharmacy data.<sup>6</sup> Self-reported compliance is probably the most commonly employed measure of compliance used in the clinical care of patients. The purpose of this study was to assess barriers to compliance to topical anti-glaucoma medications among glaucoma patients using self-reported compliance, and provide information for improving compliance in tertiary ophthalmic care settings.

## Methods

A hospital based cross-sectional study was conducted among glaucoma patients aged 18 years and over at the Glaucoma Clinic at Dr. Shroff's Charity Eye Hospital, from June 2015–Jan 2016. Dr. Shroff's Charity Eye Hospital is a tertiary referral center providing general and subspecialty services and training. The study used a semi-structured questionnaire (See [Annexure 1](#)) to assess patient reported problems and adherence to glaucoma medications. However, the method of drop administration was observed by study personnel among patients or care-givers. The questions included demographic profile (socioeconomic status calculation with Kuppusswamy scale<sup>7</sup>) and sections on barriers to compliance, patient views on glaucoma medications, number of medications, duration of treatment, and disease stability measured by visual field changes over time by treating glaucoma specialist's observation (who were masked to the nature of compliance of the patient).

The study was approved by Institutional Ethics Committee of the hospital, and the patients who received treatment at the hospital participated in the survey. The survey questions were distributed by trained clinical staff to patients who were over 18 years of age presenting to the hospital out-patient department, diagnosed with glaucoma, and had been started on medications. Patients who were on medications for less than six months were excluded from the study. Verbal consent was taken from each of the 151 patients participating in the survey.

The collected data was cleaned, edited, and coded in MS-Excel and analyzed using SPSS (Statistical Package for Social Scientist; version 20, IBM USA). Descriptive statistics in the form of frequencies and percentages were then calculated. The factors associated with non-compliance were explained

between independent and dependent variable using chi-square statistics. Statistical significance was considered when the *P*-value stood at <0.05.

In this study, 'non-compliance' stands for missing any of the drops in the last week (both partial and total non-compliance). 'Partial compliance' was defined as those missing at least one drop of medication per week and (or) the inability to accurately describe the medication regimen, and 'total non-compliance' was defined as not taking any prescribed glaucoma medication for one week. 'Full compliance' meant patient's adherence to regimen and was not missing any medication for the last one week. In addition to this, improper drop administration technique was also noted, whether the patient touched the bottle tip to the eye or if the drop missed the eye. In this study, mean defect in best eye on visual field was considered mild [better than -6 Decibel (dB)], moderate (-6 to -12 dB), and severe (worse than -12 dB).

Doctor's perception of disease stability- A patient was defined as being stable if they had stable optic disc findings on subsequent disc photographs, no visual field progression, and IOP maintained in the target range. The disease was termed unstable/progressing if the patient had progression of disc findings (progressive cupping of optic disc, broadening or deepening of retinal nerve fiber layer defects or disc hemorrhage) with progression of glaucomatous field defects on visual field associated with IOP higher than the target pressure.

## Results

A total of 151 patients were interviewed. The average age of the participants was 56.11 years, ranging from 18 years to 90 years. Most (66.23%) of the participants were over the age of 50 years, and two-thirds of them were males. Few (16.56%) of the participants were illiterate, though a majority (35.76%) were educated in the university. Most of the participants belonged to either middle or upper lower class as per Kuppusswamy scale.

A significant majority (75.50%) had bilateral involvement of glaucoma in their eyes, and those affected with either eye had almost equal representation in the left or right eye. Most of the patients were on treatment duration of 5 years or less, and around 28% reported a history of glaucoma in the family ([Table 1](#)).

Fifty-four patients (35.76%) were observed to conduct improper drop administration technique. Forty-nine patients touched the eye while instilling the drop, and 5 patients missed the eye. Around 49.33% of the interviewed patients mentioned missing at least some form of the prescribed medication in the past 1 week, with 16.67% of these patients having total non-compliance ([Fig. 1](#)). The most cited reason for non-compliance was forgetfulness, followed by outstation travel. Seven patients mentioned costs as one of the problems, while another 7 mentioned the unavailability of the prescribed drug as reasons for non-compliance ([Table 2](#)).

The level of compliance was compared between various groups of patients. The results showed that only three parameters, i.e. doctors perception of stability of the disease

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