

## Drug Utilization studies in Glaucoma patients at MGM medical College and Hospital



Pharma

**KEYWORDS :** Glaucoma, Drug utilization study

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### ABSTRACT

*The present study evaluated the pattern of drug usage for glaucoma. A Proforma was designed specifically for the study factoring patients' demographical profile, prescription regimen. A total of 100 prescriptions of patients suffering from glaucoma were analyzed. Maximum cases (36%) belonged of age group 40 to 50 years with a gender ratio (Male/female) of 2.3. All the patients were diagnosed as suffering from primary open angle glaucoma out of which 82% had bilateral glaucoma. The average number of drugs per prescription was 1.23. The total no. of drug prescribed was 123 and 18% of prescriptions showed polypharmacy practice. Most commonly prescribed drug was Timolol (41%), followed by Brimonidine 16.26%, Bimatoprost (12.19%), Dorzolamide (11.38%), Latanoprost (5.69%). Fixed dose combination (Latanoprost+Timolol) was encountered in 14% of the glaucoma patient's prescription, who had high intraocular pressure. Prescription of drugs by brand names instead of the recommended generic names is a matter of concern.*

### Introduction

Drug utilization research has been defined by the World Health Organization (WHO) as the marketing distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences<sup>(1)</sup>. The principle aim of drug utilization research is to facilitate the rational use of drug in the population. It contributes to rational drug use of drugs by analyzing the drug use pattern, generating early signs of irrational drug use and suggests intervention to improve drug usage<sup>(2)</sup>.

Drug therapy is considered to be a major component of patient management in health care settings, including primary health care. Prescribers are flooded with vast array of drug pharmaceutical preparation with innumerable trade names<sup>(3)</sup>. Periodical auditing of prescribing pattern is vital for promotion of rational use of drug, hence drug utilization studies are powerful exploratory tools to ascertain the role of drugs and their assessment is important for clinical, educational and economic purposes<sup>(4)</sup>.

Glaucoma is a condition that involves distinctive changes in the optic nerve and visual field. It is marked by raised intraocular pressure (IOP) that compresses and damages the optic nerve. Once the optic nerve is damaged, it fails to carry visual information to the brain and these results in a clinically progressive loss of peripheral visual field and ultimately vision. This optic nerve damage can ordinarily be alleviated and inhibited by sufficiently reducing IOP<sup>(5,6,7)</sup> by various anti-glaucoma medications.

In India there are approximately 11.2 million persons with glaucoma<sup>(11)</sup>. Several anti-glaucoma drugs are available to treat this disorder. Moreover, newer anti-glaucoma drugs are also getting introduced to the Indian Market. It would be interesting and perhaps enlightening, to determine the pattern of antiglaucoma drug usage in the present set up as drug utilization studies related to glaucoma from India are scarce. With this point of view the study was designed. It was undertaken to determine the prescribing pattern of anti glaucoma drugs in out-patient department of a tertiary care specialty teaching hospital.

### MATERIALS & METHODS:

Approval of the institutional ethics committee was obtained prior to the conduct of this study. The study was an Open la-

belled, Cross sectional observational study conducted in the Department of Ophthalmology, MGM Medical College and Hospital, Kamothe, Navi Mumbai Prescription of 100 Glaucoma patients attending Ophthalmology OPD from the time period Jan 2012 to Jan 2013 were analysed for the study.

A Proforma was specifically designed for the study. It included the patient's demographical profile, diagnosis, drug prescribed, and dose, route of administration, frequency and duration of treatment. Once the consultation by the Ophthalmologist was over, the desired information from the prescriptions were copied on the Proforma, and the patients were interviewed.

After noting down the required parameters, prescriptions were returned to the patients. All the prescriptions were analyzed for nature of the anti-glaucoma medication prescribed, percentage of mono-therapy Vs combination therapy prescribed, percentage of fixed dose combination prescribed, number prescribed in generics. Each parameter was expressed in percentage.

### RESULTS

In present study, 100 prescriptions of glaucoma patients were analyzed, out of which 69% were male and 31% were female patients respectively. Maximum patients (54%) were in the age group of 40 -60 yrs (Table 1).

All the patients were diagnosed as suffering from primary open angle glaucoma. The average number of drugs per prescription was 1.23. The total no. of drug prescribed was 123 and polypharmacy practices were seen in 19 prescriptions. Most commonly prescribed drug was Timolol (41%). Fixed dose combination of Latanoprost and Timolol was prescribed in 12.19% cases. All the drugs were prescribed by brand name. Other concomitant medication prescribed was Loteprednol.

Incidence of poly pharmacy was found in 18% of the prescriptions. 14 % of the prescriptions were prescribed with two drug combinations whereas triple drug combinations were prescribed in 4 % of the total prescriptions. Monotherapy was prescribed in 82% of the prescriptions, including Timolol, Brimonidine, and latanoprost out of which 14% of the prescriptions had fixed dose combination (Latanoprost+Timolol) (Fig 1)

Beta Blockers were the most commonly prescribed class of an-

ti glaucoma medication (Fig 2). Timolol was found to be the most frequently prescribed drug for glaucoma constituting 41% of the total drugs prescribed. Brimonidine comprised of 16.26%, Bimatoprost 12.19%, Dorzolamide 11.38%, Latanoprost+Timolol 12.19%, and Latanaprost 5.69% of total drug prescribed (Fig 3).

**DISCUSSION**

Various anti-glaucoma drugs are routinely prescribed in clinical practice. The pharmacological strategies for the glaucoma treatment fall into two classes: reduction of aqueous humor secretion and enhancement of aqueous outflow. Five general groups of drugs, parasymphomimetics, carbonic anhydrase inhibitors (CAI's), α-agonists, β- blockers and Prostaglandin analogs have been found to be useful in the reduction of IOP<sup>(8,9,10)</sup>.

It is important that the prescribing patterns of drug usage of the antiglaucoma medication should be studied and monitored routinely to promote rational usage of drugs. Such drug utilization studies can prevent inappropriate use of drugs which represents potential hazards to the patients and an unnecessary expense. With this point of view the present study was designed to investigate the drug utilization pattern and cost effectiveness in glaucoma out patients in department of Ophthalmology.

In present study, total 100 prescriptions of glaucoma patient were analyzed. Primary open angle glaucoma found to be most prevalent. In present study, 69 % patients were male and 31% were female patients. Maximum patient were in the age group of 40-60 yrs (55%) Yadav et al. and Patel et al conducted drug utilization studies in Rajasthan, among primary open angle glaucoma patients<sup>(11)</sup>. They had collected total 180 prescriptions out of which 55.56% were male and 44.44% were female patients. Maximum patients were in age group between 40 to 60 yrs.

Timolol, Bimatoprost, Brimonidine, Dorzolamide, Latanaprost and Fixed dose combination (Latanaprost+ Timolol) were the drugs commonly encountered in present study. Timolol was the most frequently prescribed drugs (41% of the total drug prescribed). Similar study conducted by Sharma et al found that, timolol was prescribed in 55% of the total prescriptions<sup>12</sup>. This finding concurs with the present study, where Timolol was found to be the most frequently prescribed antiglaucoma drug. However, another study conducted by Yadav et al in Rajasthan, demonstrated a higher usage of Timolol (82.22%) than the present study.

After beta-blockers, Brimonidine was the most commonly prescribed drug and constitutes 16.26% of the total drug prescribed. It may lower IOP by stimulation of an imidazoline receptor rather than an α- receptor with favorable effect on retinal blood flow. Because of its neuro-protective role it is coming up as preferred drug for glaucoma. Studies conducted by Sharma et al and Yadav et al found Brimonidine to be the second most prescribed drug<sup>(11)</sup>.

In the present study, Dorzolamide, a topical CAI with lesser systemic side effects was prescribed in 11.38% cases. This is in contrast to the results obtained by Sharma et al where Dorzolamide was not prescribed at all. Instead oral CAI, Acetazolamide, was prescribed in 4 % of the prescriptions. Studies have shown that Acetazolamide has several side effects like paraesthesia, tinnitus, GIT-disturbances, diuresis, bone-marrow depression, renal stone and systemic acidosis<sup>(12)</sup>. It may be speculated that Dorzolamide because of lesser side effects was preferred over acetazolamide as indicated in the study results.

Prostaglandin analogues were prescribed in 17.88% of the total drugs. Out of Prostaglandin analogues prescribed, Bimatoprost and Latanaprost were encountered in 12.19% and 5.69% prescriptions respectively. The study conducted by Sharma et al, showed that only one percent of prescriptions contained prostaglandin analogue with latanoprost. Bimatoprost was not prescribed in that study, which is very different from present study. In another study conducted by Yadav et al, prostaglandin analogues constitute 8.88% of total prescriptions, which is

relatively lower than present study. Similar to the present study, bimatoprost was the most commonly prescribed Prostaglandin analogues.

Fixed dose combination has the advantages of better compliance and tolerability. Fixed dose combination (Latanaprost + Timolol) was encountered in 12.19 % of the total drug prescribed. The study conducted by Yadav et al showed fixed dose combination (FDC) was prescribed in 26.66% of total prescriptions. Timolol + Dorzolamide were the most commonly prescribed FDCs<sup>(11)</sup>, but in present study Latanaprost + timolol was found to be the most commonly prescribed FDCs. In the study conducted by Sharma et al, no FDCs were prescribed<sup>(12)</sup>.

Present study demonstrated that monotherapy was prescribed in 82% cases, out of which 14% of the prescription contained fixed dose combination. Timolol, Brimonidine, latanaprost and bimatoprost were prescribed as monotherapy and (Latanaprost + Timolol) combination as FDC. Poly pharmacy was observed in 18% of the prescriptions, out of which, two drugs mainly Bimatoprost + Dorzolamide, Latanaprost + Dorzolamide and Brimonidine + bimatoprost was prescribed in 14% of the prescriptions. (Bimatoprost+ Timolol+ Dorzolamide) triple drug combinations were observed among 4% of total prescriptions. This combination has the advantage of the additive effect in lowering IOP and neuroprotective action. Results obtained by Sharma et al showed that poly pharmacy practices were most common with two drugs combination (Timolol + pilocarpine and Brimonidine + betaxolol). In contrast to the present study, no triple drug combinations were observed in the Jammu study<sup>(12)</sup>.

100% of drugs were prescribed by brand names. The study conducted by Sharma et al had demonstrated that, ten percent of the prescriptions were written in generic name and 90 % of drugs were prescribed in brand name<sup>(12)</sup>. According to WHO, prescribing guidelines all drugs should be prescribed by their generic names. In the present study 100% prescription by brand names, is indeed a matter of major concern. Therefore continuous medical education of the Physicians about the prescribing practices as indicated by WHO is essential.

The present study concludes that in our medical set up, monotherapy with Timolol was the first choice and Brimonidine was the second choice of anti-glaucoma medication among prescribers. Bimatoprost was the most commonly prescribed prostaglandin analogue and Timolol + Latanaprost the fixed dose combination. However, these findings cannot be generalized as prescribing preferences may show regional differences. Nonetheless, the findings are interesting and may provide lead for monitoring of rational drug usage in the future. Poly pharmacy practices and prescription by brand name are matter of concern.

**Table 1: Age and sex distribution of patients**

Age	Male	Female	Total (%)
Below 20	4	0	4
20-40	22	10	32
40-60	36	18	54
60-80	7	3	10
Total (%)	69	31	100

**Fig 1: Prescribing pattern of various classes of Anti-glaucoma drug**

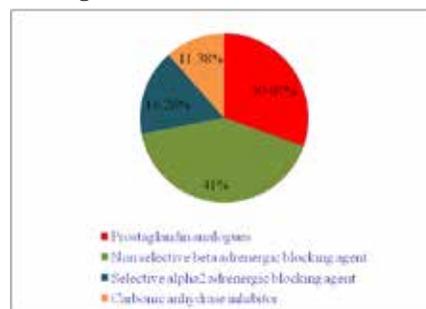


Fig. 2: Incidence of polypharmacy among glaucoma patients

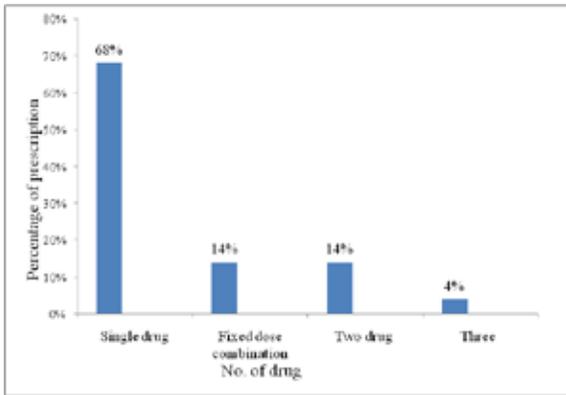
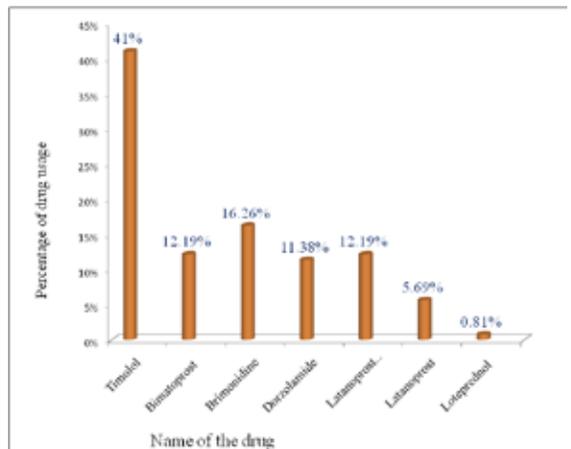


Fig. 3: Pattern of drugs prescribed for glaucoma



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