



Evaluation Of Prescribing Pattern For Various Types Of Allergic Conjunctivitis In Ophthalmology Outpatient Department Of Nalanda Medical College: A Tertiary Care Teaching Hospital Of Bihar

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ABSTRACT

Background: Prescription pattern monitoring forms an important element of the Drug Utilization Study. It provides clinicians with a feedback which they can use in improving their prescribing practices and assures rational prescription of drugs.

Objectives: To evaluate prescription patterns for patients seeking consultation for various types of allergic conjunctivitis.

Methods: It was an observational study of six months duration from June 2019 to December 2019. Newly diagnosed allergic conjunctivitis patients visiting the Ophthalmology OPD were included. Their demographic profile, diagnosis, clinical findings and drugs prescribed were noted and analysed.

Results: A total of 114 prescriptions were analysed, out of which 71 were of males (62.28%) and 43 of females (37.72%). The mean age was 11.71 ± 8.53 years with majority under 10 years of age. Seasonal Allergic Conjunctivitis (SAC) was found to be the most common type (50.88%) followed by Vernal keratoconjunctivitis (VKC) (24.56%). Perennial Allergic Conjunctivitis (PAC) accounted for 10.53% while Atopic Keratoconjunctivitis (AKC), Contact allergy (CA) and Giant Papillary Conjunctivitis (GPC) together accounted for 14.03% of the total number of cases. The dual-acting antihistaminic/mast cell stabilizing drugs were most commonly prescribed (22%) with Olopatadine at the top (16.28% of the total). Artificial tear (16.86%), topical steroids (12.29%) and systemic antihistaminics (19.43%) were other commonly prescribed drugs.

Conclusion: Among various types of allergic conjunctivitis, SAC was the most common followed by VKC, PAC, AKC, CA and GPC in that order. Dual acting drugs with both antihistaminic and mast cell stabilizing action were most commonly prescribed.

KEYWORDS : Allergic conjunctivitis, Seasonal allergic conjunctivitis, Vernal keratoconjunctivitis, Olopatadine, Artificial tear, Topical steroids

INTRODUCTION:

Allergic conjunctivitis (AC), also known as Ocular allergy is one of the most common clinical problems encountered in Ophthalmology OPD. Its prevalence has been on an increase in last few decades^{1,2} affecting 6-30% of the population³. Ocular allergy is primarily a disease of the young, affecting mostly children and adolescents with upto 30% of patients having frequent episodes and persistent symptoms³ impairing their quality of life and also affecting performance in school and workplace.

AC encompasses various clinical forms – Seasonal Allergic Conjunctivitis (SAC), Perennial Allergic Conjunctivitis (PAC), Atopic Keratoconjunctivitis (AKC), Vernal Keratoconjunctivitis (VKC), Contact Allergy (CA) and Giant Papillary Conjunctivitis (GPC). Out of these, SAC and PAC are the most common and also the milder forms of the disease while the rest are more severe forms.⁴

The most common presenting symptoms are itching, redness, irritation and watering of eyes.

On the treatment front, the avoidance of inciting allergen is the primary behavioural modification for any type of allergic conjunctivitis, but is often not possible. Anti-allergic agents including antihistaminics, mast-cell stabilizing agents and newer multimodal anti-allergic agents form the mainstay of management. These multimodal agents include drugs such as olopatadine, ketotifen, azelastine, epinastine and bepotastine. They have various pharmacological effects like antihistaminic action, mast-cell stabilizing property and inhibition of inflammatory cells and thus provide immediate symptomatic relief to the patient. These dual-acting drugs are currently the most commonly prescribed group for AC nowadays⁵.

NSAIDs and oral antihistaminics are used as add-on therapy. Topical antibiotics can be used in secondary bacterial infection. Artificial tears and decongestants provide short-

term symptomatic relief.

Corticosteroids are reserved for more severe cases. Immunomodulators such as tacrolimus and cyclosporin A are used rarely for very severe and chronic cases⁶.

Prescription pattern monitoring forms an important element of the Drug utilization study which has been defined by WHO as "the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences". The quality of prescriptions determines to a large extent how a patient is going to use the drugs. Hence, rational usage of drugs requires rational prescription of drugs. Prescribing pattern studies provide clinicians with a feedback which they can use in improving their prescribing practices.

Our study aims to ascertain the various types of allergic conjunctivitis patients visiting the ophthalmology OPD, the drugs being prescribed for them and to analyse whether the prescriptions are legibly written and most importantly rational.

MATERIALS AND METHODS:

The study was observational and cross-sectional. All patients suffering from various forms of allergic conjunctivitis visiting the ophthalmology OPD of Nalanda Medical College and Hospital, Patna, Bihar were included. One hundred and fourteen prescriptions were analysed over a period of six months (June 2019 to December 2019).

Inclusion Criteria:

- Patients of either sex and of age ≤ 30 years diagnosed with any form of allergic conjunctivitis.

Exclusion Criteria:

- Patients of age > 30 years and those not giving consent
- Patients diagnosed with other forms of conjunctivitis
- History of preceding trauma/surgery or any kind of

infection/inflammation in preceding 3 months

The patients were informed regarding the purpose and details of the study before starting data collection and informed consent forms were taken in Hindi version. In case of minors, consent was taken from parents/guardian.

Prescriptions were analysed and relevant data was noted. These included demographic profile of the patients, clinical diagnosis (type of AC), presenting symptoms and the groups of drugs prescribed with their dose, frequency, route and duration of administration.

Data was entered and analysed with Microsoft Excel and the results were expressed in percentage.

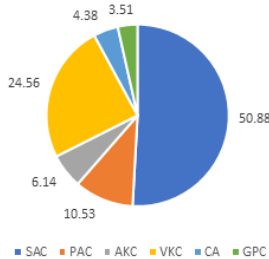
RESULTS:

A total of 114 prescriptions were analysed. The majority of patients were children of age upto 10 years (55.26%). The mean age of patients was 11.71±8.53 years. The number of male patients was higher (62.28%) (Table 1).

Table 1. Demographic Profile Of Allergic Conjunctivitis Patients

Parameters	Frequency	Percentage
AGE (in years)		
0 to 10	63	55.26
11 to 20	30	26.32
21 to 30	21	18.42
Total	114	100
GENDER		
Male	71	62.28
Female	43	37.72
Total	114	100

FIGURE 1. DISTRIBUTION OF VARIOUS TYPES OF ALLERGIC CONJUNCTIVITIS



Of the various types of allergic conjunctivitis, SAC accounted for the maximum number of cases (50.88%) followed by VKC (24.56%), PAC (10.53%), AKC (6.14%), CA (4.38%) and GPC (3.51%) (Fig. 1).

FIGURE 2. AGE WISE DISTRIBUTION OF VARIOUS TYPES OF AC

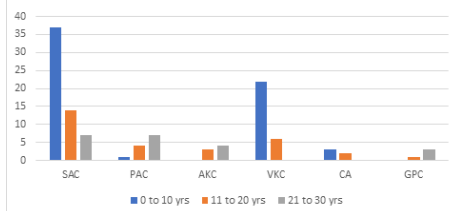
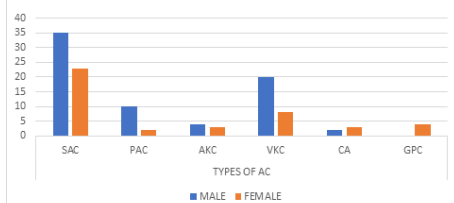


FIGURE 3. SEX WISE DISTRIBUTION OF VARIOUS TYPES OF AC



The age-wise and sex-wise distribution of various types of AC

was as shown in Fig.2 and Fig.3 respectively.

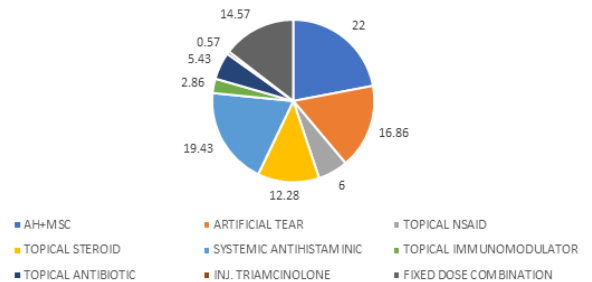
The patients most commonly presented with the symptoms of itching (30.72%) and redness (30.40%) with very slight difference between the two. Watering (19.93%) and irritation (18.95%) were other frequently encountered symptoms.

Among the various medications prescribed, drugs with both antihistaminic and mast cell stabilizing properties (AH+MSC) were the most common followed by systemic antihistaminic and artificial tear. The frequency of various groups of drugs prescribed has been shown in Table 2.

Table 2. Groups Of Drugs Prescribed For Various Types Of AC

DRUGS PRESCRIBED	FREQUENCY	PERCENTAGE
ANTIHISTAMINIC + MAST CELL STABILIZER (TOPICAL)	77	22.00
ARTIFICIAL TEAR (TOPICAL)	59	16.86
TOPICAL STEROID	43	12.28
TOPICAL NSAID	21	6.00
TOPICAL ANTIBIOTIC	19	5.43
TOPICAL IMMUNOMODULATOR	10	2.86
FIXED DOSE COMBINATION (TOPICAL)	51	14.57
SYSTEMIC ANTIHISTAMINIC	68	19.43
INJ. TRIAMCINOLONE (SUB-CONJUNCTIVAL)	02	0.57
TOTAL	350	100

FIG.4 DISTRIBUTION OF VARIOUS GROUPS OF DRUGS PRESCRIBED FOR AC



Most of the drugs were given through the topical route (76.86% as eyedrops and 3.14% as gel). Rest 19.43% were given through the oral route (tablet/syrup) and a very small percentage as injection (0.57%). The prescription pattern of various drugs in different types of AC is shown in Table 3.

Table 3. Drug Prescribing Pattern In Patients Treated With Various Types Of Allergic Conjunctivitis

DRUG GROUPS	TYPES OF AC						PERCENTAGE
	SAC	PAC	AKC	VKC	CA	GPC	
AH+MSC							
olopatadine 0.1%	15	2	2	10	1	0	8.57%
olopatadine 0.2%	11	4	2	9	0	1	7.71%
alcftadine	2	1	1	2	0	0	1.71%
bepotastine	4	1	1	5	0	0	3.14%
epinastine	1	1	0	0	1	0	0.86%
							22.00%
ART. TEAR							
carb.oxymeth.cel. 0.5%	12	2	0	6	2	0	6.29%
carb.oxymeth.cel. 1%	5	4	2	5	1	2	5.43%
hypromellose	3	2	1	3	0	0	2.57%
sod. Hyaluronate 0.1%	2	2	2	1	0	2	2.57%
							16.86%
TOP. NSAID							
ketorolac 0.4%	8	7	4	1	0	1	6.00%
TOP. STEROID							
loteprednol 0.2%	9	2	3	5	1	2	6.29%
loteprednol 0.5%	8	1	0	0	0	2	3.14%
fluorometholone 0.1%	2	0	0	7	0	0	2.57%
dexamethasone 1%	0	0	0	0	0	0	0.00%
prednisolone 1%	0	0	1	0	0	0	0.29%
							12.29%
SYSTEMIC ANTIHISTAMINIC							
tab. cetirizine	12	4	3	6	1	0	7.43%
tab. Levocetirizine	11	2	1	4	1	0	5.43%
syp. Cetirizine	6	1	0	8	2	0	4.86%
syp. Levocetirizine	4	0	0	2	0	0	1.71%
							19.43%

TOP. IMMUNOMOD.							
cydospirine 0.05%	0	2	1	0	0	0	2.00%
tacrolimus 0.03%	0	6	1	0	0	0	0.86%
							2.86%
TOP. ANTI-BIOTIC							
moxifloxacin 0.5%	2	0	0	8	0	0	2.86%
gatifloxacin 0.3%	1	0	0	0	0	0	0.29%
tobramycin 0.3%	3	0	0	5	0	0	2.29%
							5.43%
							0.57%
Inj. Triamcinolone 10 mg							
	0	0	0	0	0	2	
FIXED DOSE COMBINATION							
PEG 0.4% + prop gly. 0.3%	5	2	2	1	0	0	2.86%
olopat. 0.1% + keto. 0.4%	5	3	0	2	0	0	2.86%
moxi. 0.5% + keto. 0.4%	6	0	0	0	0	0	1.71%
moxi. 0.5% + lotepred 0.5%	9	0	0	2	1	0	3.43%
moxi. 0.5% + dexameth. 1%	2	0	0	0	1	0	0.86%
fluorometh 0.1%+Tobra 0.3%	6	0	0	3	1	0	2.86%
							14.57%
TOTAL	154	49	27	95	13	12	

NOTE: ART. TEAR- artificial tear; carboxymeth. – carboxymethylcellulose; sod. hyaluronate- sodium hyaluronate; TOP – topical; PEG- polyethylene glycol; prop. gly.- propylene glycol; olopat. – olopatadine; keto. - ketorolac; moxi.- moxifloxacin; lotepred- loteprednol; dexameth.- dexamethasone; fluorometh. – fluorometholone; tobra.- tobramycin.

DISCUSSION:

Allergic conjunctivitis is a common disorder affecting mainly the younger age group. In our study, most of the patients belonged to 0-10 years age group (55.26%); the number declining with increasing age– 26.32% in 11-20 years group while 18.42% in 21-30 years group. This finding is consistent with that of Malu N. K who has reported a significantly higher prevalence in the younger age group (38.4% in 0-16 years group) as compared to older age groups⁸. Also, Baab *et al* have reported that in most of the cases, onset occurs in patients younger than 20 years old with decreasing prevalence in older populations⁹.

The majority of patients in our study were males (62.28%). The male to female ratio was different for different types of AC. It was higher in most of the subtypes except CA and GPC. For SAC, it was 1.5:1; for PAC, 5:1; for AKC 1.3:1; for VKC, 2.5:1; for CA, 0.7:1; and in GPC, all the patients were females. In a study conducted by R. Belfort *et al*, this ratio for PAC, AKC and VKC were 1:4, 1:1 and 5:1 respectively¹⁰.

In another study by Baab *et al*, the male to female ratio for AKC and VKC both were 2:1 to 3:1³.

SAC was found to be the most commonly encountered type of AC with 50.88% of total cases followed by VKC (24.56%), PAC (10.53%), AKC (6.14%), CA (4.38%) and GPC (3.51%) in our study. The results of a large prospective study by Uchio *et al* resemble the results of our study to some extent. They have reported that SAC, PAC, AKC and VKC account for 81.2%, 10.6%, 4.4% and 3.8% respectively¹¹. While in another study by R. Belfort *et al*, VKC formed 46% of total cases¹⁰. This difference in the number of cases of various types of AC could be due to variations in climatic conditions. SAC most commonly occurs during spring and autumn when levels of seasonal allergens is high in the environment¹² while PAC occurs due to allergens which are present throughout the year^{12,13,14}. VKC, on the other hand, is more prevalent in countries with hot and humid climate¹⁵.

The patients in our OPD most commonly presented with symptoms of itching (30.72%) and redness (30.40%). Watering (19.93%) and irritation (18.95%) were other common symptoms. Various studies have reported itching and redness as the most consistent symptoms of AC^{15,16}. A study by Sanchez *et al* have documented itching as the main symptom¹⁷ while another study on VKC by U S Saboo *et al* have reported itching (88%) and redness (86%) to be the most common symptoms¹⁸. Among the various groups of drugs prescribed, the topical dual-acting antihistamine/ mast cell stabilizers were the most common (22%) with olopatadine leading the chart (16.28%). Olopatadine has been reported as the most commonly prescribed drug in other studies as well¹⁹. Bepotastine (3.14%), alcaftadine (1.71%) and epinastine (0.86%) were other

commonly used drugs. The efficacy of these medications has been proved in many previous studies^{20,21,22,23,24}.

Artificial tears was another very commonly prescribed group of drugs (16.86%) even though they do not treat the underlying allergic response. This could be due to symptomatic relief they offer to the patients. Carboxymethyl cellulose was the most commonly prescribed drug in this group (11.72%) followed by Hypromellose (2.57%) and sodium hyaluronate (2.57%).

The topical NSAID, ketorolac formed 6% of the total drugs prescribed. This low number can be attributed to the discomfort it causes to the patients upon instillation reducing compliance^{25,26}.

Topical corticosteroids are the most effective therapeutic agents for the treatment of AC. As such they have an important place in the prescriptions for the same. In our study, they accounted for 12.29% of the total drugs prescribed of which loteprednol was the most common (9.43%). This is in accordance with another study conducted by Suman RK *et al*¹⁹.

Systemic antihistaminics were commonly prescribed (19.43%).

Topical immunomodulators (2.86%) and inj. Triamcinolone (0.57%) were rarely prescribed. Topical antibiotics formed only 5.43% of the total. Moxifloxacin was the most commonly prescribed antibiotic both as single drug and in fixed dose combination.

Fixed dose combinations formed 14.57% of the total number of drugs prescribed. This figure is much less when compared to the study done by Dutta SB *et al* on the prescribing pattern in ophthalmology OPD²⁷. Prescription of fixed dose combinations in higher numbers ensures better patient compliance and also reduces the cost of treatment. Moxifloxacin and loteprednol combination was the most commonly used one (23.53% of the total FDCs prescribed).

The present study reveals that most of the drugs were prescribed as eyedrops (74.57%). 5.43% were prescribed in gel form while 19.43% were directed to be taken orally and very few (0.57%) as injection. This finding is similar to that of a study conducted by Prajapati VI *et al*²⁸. The drugs were prescribed mostly by their brand names (79.71%); only 20.29% by their generic names. The higher prescription by brand names could be due to better quality assurance with certain brands.

Total 350 drugs were prescribed in 114 prescriptions giving the average number of drugs per prescription to be 3.1 which is higher than the WHO recommended value of 2²⁹ thus indicating polypharmacy. However, this value is similar to a study on drug utilization in secondary level government hospitals in Maharashtra, India³⁰. Polypharmacy may result in unwanted drug interactions and resultant adverse effects.

CONCLUSIONS:

With this study, we have tried to assess the prevalence and prescribing patterns of various types of AC in our region. While there have been many studies in other parts of the country, much reliable data is not available from our region.

In our study, SAC was found to be the most common type of AC and olopatadine the most commonly prescribed drug. Newer drugs like alcaftadine, bepotastine and epinastine are also gaining popularity among the clinicians.

The present study also reflects the need to prescribe more by generic names as per the government policy and also to reduce the number of drugs per prescription i.e. polypharmacy. We hope to provide right feedback to the ophthalmologists.

REFERENCES:

1. Maziak W, Behrens T, Brasky TM, Duhme H, Rhezak P, et al. (2003) Are Asthma and Allergies in Children and Adolescents Increasing? Results from ISAAC Phase I and Phase III Surveys in Munster, Germany. *Allergy*, 58, 572-579.
2. Verlato G, Corsico A, Villani S, Cerveri I, Migliore E, Accordini S, Carolei A, Piccioni P, Bugiani M, Lo Cascio V, Marinoni A, Poli A, de Marco R. Is the prevalence of adult asthma and allergic rhinitis still increasing. Results of an Italian study. *J Allergy Clin Immunol*. 2003;111:1232-1238.
3. Leonardi A, Castegnaro A, Valerio AL, Lazzarini D. Epidemiology of allergic conjunctivitis: clinical appearance and treatment patterns in a population-based study. *Curr Opin Allergy Clin Immunol*. 2015;15:482-488.
4. Ehlers WH, Donshik PC. Allergic ocular disorders: a spectrum of diseases. *The CLAO journal: official publication of the Contact Lens Association of Ophthalmologists, Inc.* 1992 Apr;18(2):117-24.
5. Barney NP, Grazziano FM (2003). Allergic and immunological diseases of the eye. In: NFJ Adkinson, JW Yunginger, WW Busse, BS Bochner, ST Holgate & FE Simons (eds). *Middleton's allergy: principles & practice*, vol. 2. St. Louis, MO: Mosby, 1599-1617.
6. Nir Erdinest, Abraham Solomon. Topical immunomodulators in the management of allergic eye diseases. *Curr Opin Clin Immunol*. 2014 Oct;14(5):457-63.
7. WHO, the selection of essential drugs. WHO technical report 1977;615:36.
8. Keziah N. Malu. Allergic Conjunctivitis in Jos-Nigeria. *Niger Med J*. 2014 Mar-Apr; 55(2): 166-170.
9. Baab S, Kinzer EE. Allergic Conjunctivitis. In: *StatPearls* [Internet]. Treasure Island (FL): Statpearls Publishing; 2019 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK448118/>
10. R. Belfort, P. Marbeck, C. C. Hsu, D. Freitas. Epidemiological study of 134 subjects with allergic conjunctivitis. *Acta Ophthalmologica Scandinavica*, 2000; Supplement, vol. 78, no. 230:38-40.
11. Uchio E, Kimura R, Migita H, Kozawa M, Kadonosono K. Demographic aspects of allergic ocular diseases and evaluation of new criteria for clinical assessment of ocular allergy. *Graefes Arch Clin Exp Ophthalmol* 2008;246:291-296.
12. Chambless SL, Trocme S. Developments in ocular allergy. *Curr Opin Allergy Clin Immunol*. 2004 Oct;4(5): 431-4.
13. Stahl JL, Barney NP. Ocular allergic disease. *Curr Opin Allergy Clin Immunol*. 2004 Oct;4(5):455-9.
14. Bielory BP, O' Brein TP, Bielory L. Management of seasonal allergic conjunctivitis: guide to therapy. *Acta Ophthalmologica* 2012 Aug;90(5):399-407.
15. Ono SJ, Abelson MB. Allergic conjunctivitis: update on pathophysiology and prospects of future treatment. *J Allergy Clin Immunol*. 2005 Jan; 115(1):118-22.
16. Bielory L, Friedlander M. Allergic Conjunctivitis. *Immunol Allergy Clin North Am*. 2008;28(4):3-58.
17. Sanchez MC, Parra BF, Matheu V, Navarro A, Ibanez MD, Davila I, Dordal MT. Allergic Conjunctivitis. *J Investig Allergol Clin Immunol* 2011; Vol.21, Suppl. 2:1-19.
18. Saboo US, Jain M, Reddy JC, Sangwan VS. Demographic and clinical profile of vernal keratoconjunctivitis at a tertiary eye care center in India. *Indian J Ophthalmol* 2013;61:486-9.
19. Suman RK, Gore VS, Mohanty IR, Neeraj Israni, YA Deshmukh. Prescribing patterns of drugs used for treatment of conjunctivitis in ophthalmology outpatient department of tertiary care hospital. *Int J Health Sci Res*. 2015; 5(3):194-199.
20. Ackerman S, D' Ambrosio F Jr, Greiner JV, Villanueva L, Ciolino JB, Hollander DA. A multicenter evaluation of the efficacy and duration of action of alcaftadine 0.25% and olopatadine 0.2% in the conjunctival allergen challenge model. *J Asthma Allergy* 2013;6:43-52.
21. McLaurin EB, Marsico NP, Ciolino JB, Villanueva L, Williams JM, Hollander DA. Alcaftadine 0.25% versus olopatadine 0.2% in prevention of ocular itching in allergic conjunctivitis. *J Allergy Clin Immunol* 2014;133:AB278.
22. Greiner JV, Edwards-Swanson K, Ingerman A. Evaluation of alcaftadine 0.25% ophthalmic solution in acute allergic conjunctivitis at 15 minutes and 16 hours after instillation versus placebo and olopatadine 0.1%. *Clin Ophthalmol* 2011;5:87-93.
23. McLaurin EB, Marsico NP, Ackerman SL, Ciolino JB, Williams JM, Villanueva L, et al. Ocular itch relief with alcaftadine 0.25% versus olopatadine 0.2% in allergic conjunctivitis. Pooled analysis of two multicenter randomized clinical trials. *Adv Ther* 2014;31:1059-71.
24. Bergmann MT, Williams JJ, Gomes PJ. Treatment of allergic conjunctivitis with bepotastine besilate ophthalmic solution 1.5%. *Clin Ophthalmol* 2014;8:1495-505.
25. Butrus S, Portela R. Ocular allergy: diagnosis and treatment. *Ophthalmol Clin North Am* 2005;18:485-492.
26. Bielory L, Katelaris CH, Lightman S, Naclerio RM. Treating the ocular component of allergic rhinoconjunctivitis and related eye disorders. *MedGenMed* 2007;9:35.
27. Dutta SB, Beg MA, Mittal S, Gupta M. prescribing pattern in ophthalmological outpatient department of a tertiary care teaching hospital in Dehradun, Uttarakhand: a pharmacoepidemiological study. *Int J Basic Clin Pharmacol* 2014;3:547-52.
28. Prajapati VI, Yadav AK. Drug use in Ophthalmology Outpatient Department: A Prospective study at a Tertiary Care Teaching Hospital. *Indian Journal of Pharmacy Practice* 2012;5:44-8.
29. WHO. How to investigate drug use in health facilities: Selected drug use indicators. Geneva: World Health Organization. WHO/DAP 1993; 1:1-87.
30. Potharaju HR, Kabra SG. Prescription audit of outpatient attendees of secondary level government hospitals in Maharashtra. *Indian J Pharmacol*. 2011 Apr; 43(2):150-6.