

# “Investigation of the Bacterial etiology of ocular and per ocular Infections and testing its antimicrobial susceptibility pattern with association factors among patients attending eye unit of Rama Tertiary care Hospital Kanpur, India.”

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## Abstract:

**Introduction:** The infection in the eye is one of the major public health problem in the developing countries specially India, Indonesia etc. Bacteria are major cause of eye infections that lead to loss of vision. The objective of the study is to study the Bacterial etiology of ocular and per ocular Infections and test it's AST.

**Aim and Objective:** To investigate the Bacterial profile of ocular and per ocular Infections and testing its antimicrobial susceptibility pattern with association factors among patients.

**Material and Methods:** Our study is a cross-sectional study, conducted in the Department of Microbiology and Ophthalmology for the period of 1 year i.e, February 2019 to February 2021. Specimens from the ocular and per ocular areas were collected from a total of 250 patients who visited the eye unit of the Tertiary Care hospital.

**Results:** Out of the total 250 samples taken in our study, participants with ocular and per ocular infections, 180 (72%) were culture positive. In our study the number of Gram-positive and Gram-negative bacteria were 120 (66.6%) and 60 (33.3%) respectively. Among the growth Staphylococcus aureus was the most common isolated in Gram-positive bacteria and in Gram-negative bacteria, Escherichia coli was the most predominant isolate.

**Conclusion:** The gram positive bacteria were the most common isolates. The identification of the causal bacteria and antimicrobial sensitivity tests are mandatory to select the effective drug for the treatment of eye infections and prevent the development of antibiotic-resistant bacteria.

**Keywords:** Ocular, Periocular, AST, CLSI

## Introduction

The eye is one of the sense organs in humans which is important throughout life for daily activities. There should be awareness regarding the eye health and cleanliness that's essential not only because it's a part of our body but because it is one of the main sense organ for vision. Dust, high temperature, microorganisms, and other factors can lead to eye diseases which may lead to loss of sight [1]. Bacteria are major cause of ocular infections and possible loss of vision. The emergence of antimicrobial resistant bacteria increases the risk of treatment failure with potentially serious consequences. The source of eye infection can be exogenous or endogenous [2]. The clinical signs and symptoms of inflammation of the eyes along with pus are frequently caused by bacteria. Globally, purulent bacterial conjunctivitis is mainly caused by Gram-positive bacteria. The most common causative agents are Staphylococcus epidermidis, Staphylococcus aureus, Streptococcus pneumoniae,

And Homophiles influenza [3]. The microbial etiology and drug susceptibility, as well as resistance profile may differ with geographic location [4]. The common way of transmission of pathogens is the contact with contaminated fingers, eyelids margins, and adjacent skin, from the nasopharynx via the nasolacrimal duct, from infected eye drops or contact lenses and more rarely from the genitals or via the bloodstream [5].

## Material and Methods

This was a cross-sectional study which was conducted in the Department of Microbiology and Ophthalmology for the period of 9 months i.e, January 2021 to September 2021. Specimens from the ocular and per ocular areas were collected from a total of 250 patients who visited the eye unit of the Rama hospital. The sample from the eye was collected from eyelids and conjunctiva using a sterile cotton swab dipped with sterile saline. The swab was rolled over the eyelid margin from medial to the lateral side and back again. Pus from lacrimal sac (dacryocystitis) and blepharitis was collected. The sample was transported to the Laboratory soon after the collection in a sterilize condition and process according to the CLSI guidelines. [6]

The isolates were identifying using the gram's staining followed the biochemical tests. Patients on antibiotics treatment were excluded from the study. Antimicrobial

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susceptibility testing was carried out for each identified bacterium using disc diffusion method according to the CLSI guidelines [6].

**Results**

The diagnosis was recorded and the specimen was collected by attending ophthalmologist from all study participants presented with Ocular and per ocular infections. In our study, Out of the total 250 samples taken in our study, participants with ocular and per ocular infections, 180 (72%) were culture positive. Among the culture positive isolates, the proportions of clinical finding were mainly conjunctivitis (70) , dacryocystitis (40) , blepharitis (40), and blephero-conjunctivitis (30) From the total study participants, the Males were 120 (66.7%) whereas Females were 60(33.5%). The maximum number of cases was in the age group above 40 years followed by 30-40 years of age and least was recorded in the age group of 10 years

and below Years. The maximum number of cases were maximum in the Rural area with 130(72.2%) then in Urban area were 50 (27.7%). And the number of cases was more in rural areas in which the maximum number of cases were of the students and the farmers in our study.

In our study the number of Gram-positive and Gram-negative bacteria were 120 (66.6%) and 60 (33.3%) respectively. Among the growth Staphylococcus aureus was the most common isolated in Gram-positive bacteria and in Gram-negative bacteria, Escherichia coli was the most predominant isolate.

**Table no.1 Gender wise Distribution of bacteria isolated from the study**

Gender	Number Of Isolates	Percentage
Male	120	66.7%
Female	60	33.5%

**Table no.2 Distribution of bacteria isolated from study participants with ocular and periocular infections based on their Gram reaction,**

Bacteria based on Gram reaction	Isolated bacteria	Number of isolates	(%)
Gram positive bacteria	<i>S. aureus</i>	65	54.10%
	<i>CoNS</i>	50	41.60%
	<i>S. pneumoniae</i>	5	4.10%
Gram negative bacteria	<i>E. coli</i>	20	33.30%
	<i>Klebsiella pneumoniae</i>	17	28.30%
	<i>Moraxella spp.</i>	7	11.60%
	<i>Citrobacter spp.</i>	4	6.60%
	<i>N. gonorrhoeae</i>	3	5%
	<i>H. influenzae</i>	3	5%
	<i>N. meningitidis</i>	2	3.30%
	<i>Pseudomonas spp.</i>	2	3.30%
	<i>Proteus mirabilis</i>	2	3.30%
	<b>Total</b>		180

From our study the number of Gram-positive 111 (92.5%) was susceptible to gentamicin, clindamycin, and erythromycin respectively. Among the gram positive isolates *S. aureus* was the common isolate followed by *Cons*. In 65 *S. aureus*, 35(53.8%) and 30(46.1%) were resistant to penicillin and tetracycline respectively. and Gram-negative bacteria were 60 (33.3%) respectively. In which *E.coli* was the most dominant followed by *Klebsiella pneumoniae*.

Among the growth *Staphylococcus aureus* was the most common isolated in Gram-positive bacteria and in Gram-negative bacteria, *Escherichia coli* was the most predominant isolate. Majority of *CoNS* were resistant to penicillin and tetracycline All *S. pneumoniae* isolates were susceptible to penicillin Among 60 Gram-negative bacteria isolated 50(83.3%) were susceptible to ciprofloxacin, and ceftriaxone respectively.

## Discussion

In our study, a total of 250 patients seeking treatment for eye infection at Rama tertiary care centre were studied. Out of the total 250 samples taken in our study, 180 (72%) were culture positive. Among the culture positive isolates, the proportions of clinical finding were mainly conjunctivitis (70), dacryocystitis (40), blepharitis (40), and blephero-conjunctivitis (30) [7].

From the total study participants, the Males were 120 (66.7%) whereas Females were 60 (33.5%) which was similar to the study by Mshangila B [8] and Akililu [9]. In our study Gram positive bacteria was more than the Gram negative bacteria, which supported our study by other authors [9] [10]. In the current study, the predominant bacterial isolates were *S. aureus* (54.1%) followed by CoNS (41%) and then *S. pneumonia* (4.1%). The finding of this study is comparable with previous studies conducted in Ethiopia [11, 12, 13] and India [14]. In the Gram negative bacteria, *E. coli* was the most common isolate which was supported by other study also [12, 15]. In this study, the majority of bacteria were resistant to tetracycline and penicillin, while most of the *E. coli* isolates were susceptible to ciprofloxacin. This finding is in agreement with the study conducted in Gondar, Ethiopia [16]. The reason for increased resistance to penicillin and tetracycline may be prior exposure of the isolates to these antibiotics. Moreover, these antibiotics are common and patients can access them easily with low price. According to Getahun et al. [11] previous use of antimicrobials and duration of present illness was significantly associated with bacterial eye infection. Proper Screening programs specially to avoid bacterial colonization of the isolates should be checked [17].

## Limitation of the Study

Identification of the bacteria in this study does not necessarily mean that the isolated bacteria were responsible for the infection/inflammation.

## Conclusion

Treatment of bacterial eye infections involves is very important with its empirical treatment with topical ophthalmic .Broad-spectrum antibiotic formulations that become a prevailing practice among ophthalmologists and general practitioners. This along with the irrational use of drugs, availability of antibiotics without prescription, has led to the development of resistance to commonly used antibiotics, therefore strict regulation policy should be followed to stop the misuse of the drug.

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