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RESEARCH ARTICLE
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TO STUDY BACTERIAL PHENOTYPIC CHARACTERIZATION AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF CORNEAL ULCER ISOLATES FROM CLINICAL CASES AT TERTIARY CARE HOSPITAL

Ahmad Raza[1*], Sr. Prof Dr Shama Tomar[2]

[1]M.Sc. Medical Microbiology Department of Microbiology National Institute of Medical Sciences and Research, Jaipur (India)
[2]Professor & Ex-HOD Department of Microbiology National Institute of Medical Sciences and Research, Jaipur (India)

***Corresponding Author:** Dr. Ahmad Raza
*Department of Microbiology, National Institute of Medical Sciences and Research, Jaipur (India)

Abstract
Background: Corneal ulcers are a significant cause of ocular morbidity and can lead to vision impairment or blindness if untreated. Bacterial infections contribute substantially to corneal ulceration, and the emergence of antimicrobial resistance (AMR) presents challenges in treatment. This study aims to evaluate the bacterial phenotypic characteristics and antimicrobial susceptibility patterns of bacterial isolates from corneal ulcer cases at a tertiary care hospital.

Keywords: Corneal ulcers, bacterial infections, antimicrobial resistance (AMR), bacterial phenotypic characteristics, antimicrobial susceptibility, Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella pneumoniae, multidrug resistance (MDR), Kirby-Bauer disk diffusion method, ocular infections, microbiological diagnosis, culture-guided therapy.

INTRODUCTION

Corneal ulcers are a major cause of visual impairment and blindness, especially in developing countries. These ulcers are often caused by bacterial infections that invade the corneal tissue, leading to inflammation, scarring, and, if untreated, permanent vision loss. The rise of antimicrobial resistance (AMR) among ocular pathogens is increasingly complicating the management of corneal ulcers. Accurate identification of the microbial pathogens and their antimicrobial susceptibility profiles is essential for optimizing treatment regimens and preventing the escalation of resistance.

Materials and Methods:
Study Design and Setting This cross-sectional study was conducted in the Department of Microbiology, National Institute of Medical Science & Research, Jaipur, Rajasthan, over one year (January 2023–January 2024).

SAMPLE COLLECTION AND PROCESSING:
The Corneal ulcer swab scrapping sample will be collect using sterile wet swabs in Glucose broth with all aseptic precautions directly from its eyes.

Collected sample will be swabs, scrapping label for each patient which includes Laboratory no, registration number, type of specimens and investigation required. Collected samples will be transport in proper transport (TSoy broth) medium and process in the microbiology laboratory.

RESULTS

A total of 20 clinically suspected swab & scrapping samples of corneal ulcer were proceeded from IPD & OPD Patients, attending NIMS Hospital. Out of which 16 (80%) were male patients and 4 (20%) were female patients.

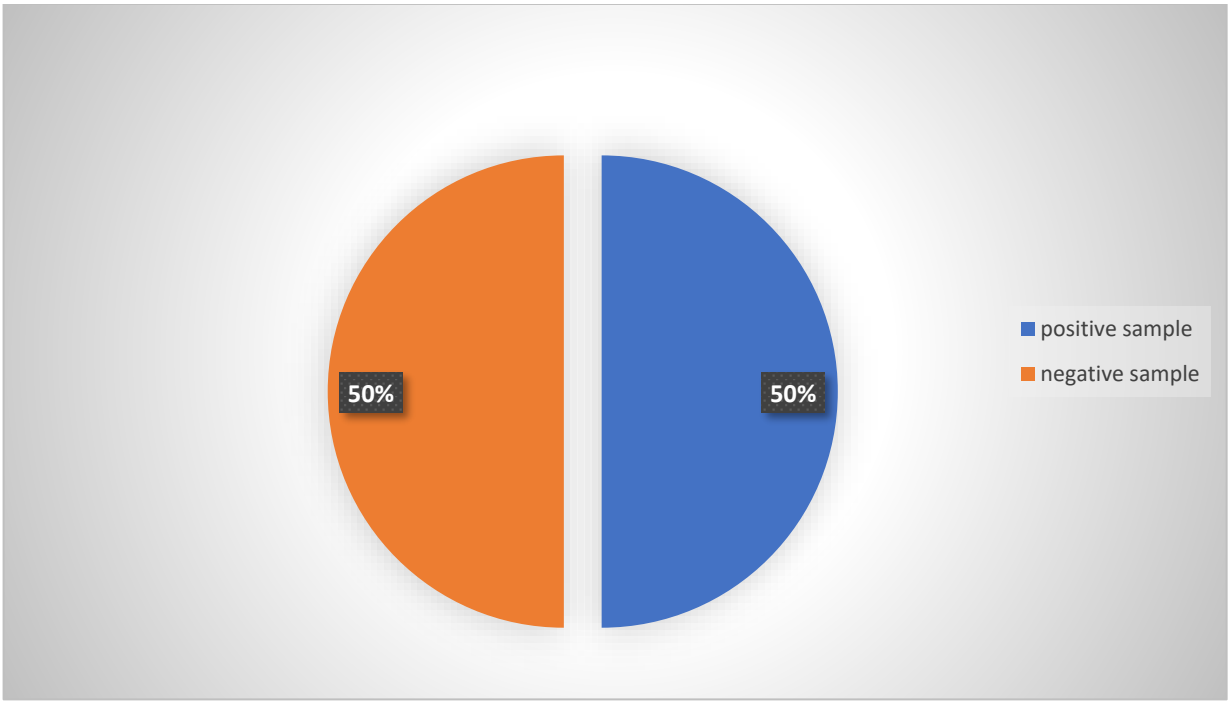
Male	Female	Total
16 (80%)	4 (20%)	20 (100%)

Table No. 1.1 – Table showing Sexwise Distribution.

A total of 20 clinically suspected swab & scrapping samples of corneal ulcer were collected from IPD & OPD Patients attending NIMS Hospital. Out of which 10 samples were shows growth on culture media and other 10 didn't show any growth. The given table no. shows the no. of positive and no. of negative samples.

Positives/ Negatives	No. Of Samples
Positives	10 (50%)
Negatives	10 (50%)
Total	**20 (100%)**

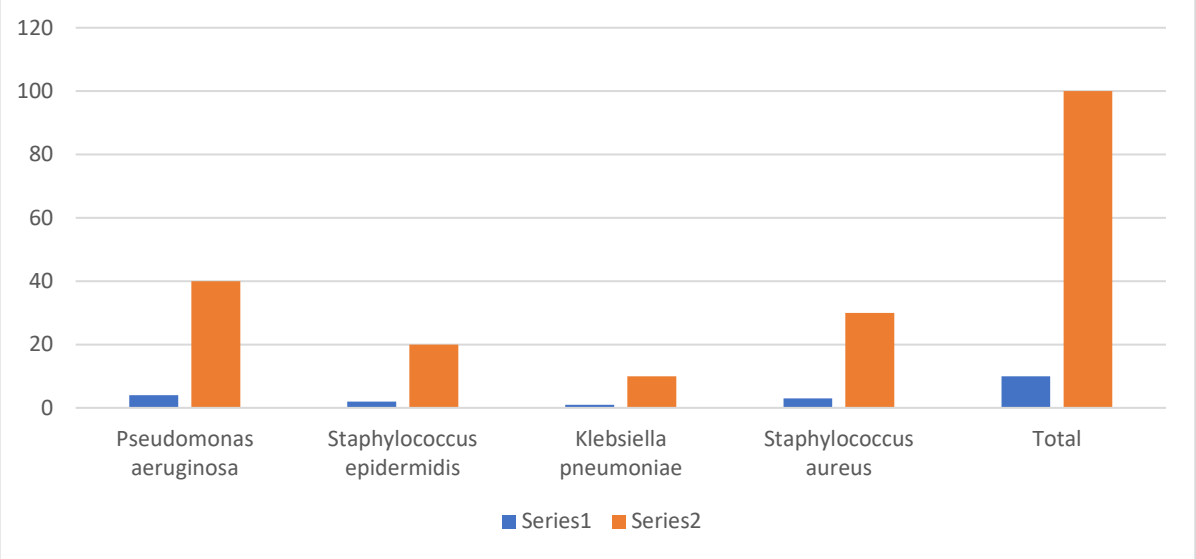
Table shows the No. of Positive and Negative Samples



Out of 20 clinically suspected swab & scrapping samples of corneal ulcer collected from NIMS Hospital, Jaipur, Rajasthan. A total of 10 samples positively shows the growth of the following microorganisms such as *Pseudomonas aeruginosa, Staphylococcus epidermidis, Klebsiella pneumoniae, Staphylococcus aureus etc.* are *shown* in the table No.2.

Organisms	No of Isolates	Percentage (%)
Pseudomonas aeruginosa	4	40
Staphylococcus epidermidis	2	20
Klebsiella pneumoniae	1	10
Staphylococcus aureus	3	30
Total	**10**	**100**

Table No. 2.1 Shows the No. of Isolates and their Percentage



DISCUSSION

Corneal ulcers, which often lead to severe visual impairment and blindness if left untreated, are a major concern in ophthalmology. Identifying the causative microorganisms and their resistance patterns is vital for appropriate treatment and prevention of complications. This study aimed to examine the microbial ethology of corneal ulcers in patients at NIMS Hospital, Jaipur, Rajasthan. The findings revealed that *Pseudomonas aeruginosa* and *Staphylococcus aureus* were the most frequently isolated pathogens, which is consistent with several other studies conducted worldwide

CONCLUSION

In conclusion, the findings of this study are consistent with global trends regarding the microbial ethology of corneal ulcers. The predominance of *Pseudomonas aeruginosa* and *Staphylococcus aureus* underscores the need for comprehensive microbial investigations in suspected corneal ulcer cases. Given the high prevalence of antibiotic resistance, timely and appropriate treatment, guided by microbial identification and susceptibility testing, is critical for preventing complications and ensuring favourable patient outcomes. Further large-scale studies and surveillance programs are needed to monitor the evolving microbial landscape and resistance patterns in corneal infections.

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