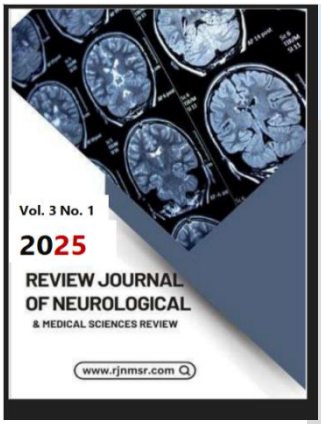


Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

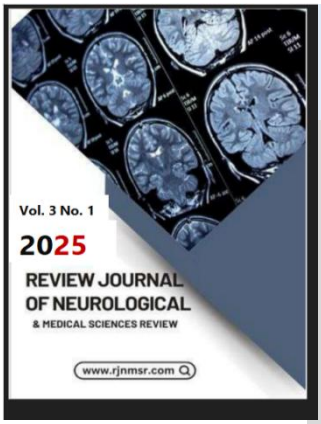
E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

Isolation Of Bacterial Pathogen And Antibiotic Sensitivity Analysis Of Breast Abscess In Lactating And Non-Lactating Women

Afshan Abid[1]
Abasyn University, Chak Shahzad Campus, Islamabad
Sadaf Akhlaq2
Abasyn University, Chak Shahzad Campus, Islamabad
Nandni Kumari[3]
Isra University, Hyderabad
Shahzeera Begum[4]
Department of Medical Lab Technology, Al Nafees Medical College and Hospital, Isra University Islamabad, Pakistan
Maryam Khalid[5]
Department of Medical Lab Technology, Al Nafees Medical College and Hospital, Isra University Islamabad, Pakistan
Mahe-Kamil Qureshi Hashmi[6]
Professional College of Nursing and Allied Health Sciences, Islamabad
Maira Ayoub[7*]
Quaid I Azam university Islamabad. Corresponding Author Email: Abidayub2@gmail.com

Abstract

This study aimed to isolate and identify bacterial pathogens from breast abscess samples of women attending different tertiary care hospital in Rawalpindi, Pakistan, and to evaluate the antibiotic susceptibility of these isolates. Pus samples were collected from both lactational and non-lactational women and processed using standard microbiological techniques, including culture on selective media, Gram staining, and biochemical tests. Antibiotic susceptibility testing was performed using the Kirby-Bauer disc diffusion method following CLSI guidelines. The predominant bacterial isolates were *Staphylococcus aureus*, *Escherichia coli*, Streptococci, and *Pseudomonas aeruginosa*. *S. aureus* exhibited high susceptibility to ciprofloxacin, levofloxacin, and amikacin, but resistance to streptomycin and amoxicillin. *P. aeruginosa* was most susceptible to ciprofloxacin and clarithromycin, while showing resistance to streptomycin, amoxicillin, and amikacin. *E. coli* was susceptible to ciprofloxacin and clarithromycin, but resistant to amikacin, amoxicillin, and streptomycin. *Streptococci* showed susceptibility to ciprofloxacin, levofloxacin, and clarithromycin, but resistance to moxifloxacin and amikacin. The findings of this study highlight the importance of routine microbiological culture and antibiotic susceptibility testing for effective management of breast abscess infections.



Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

Introduction

Breast abscess is a localized collection of purulent material within the breast tissue, commonly encountered in women, and represents a significant clinical concern in both lactating and non-lactating populations [1]. This condition can be classified into two primary categories: lactational and non-lactational abscesses. Lactational abscesses predominantly affect women of reproductive age, particularly those who are breastfeeding, while non-lactational abscesses are more frequently observed in perimenopausal women and those with underlying health conditions [2].

The clinical presentation of breast abscesses typically includes painful, swollen, and reddish masses within the breast, often accompanied by systemic symptoms such as fever and malaise [3]. These abscesses can significantly impact a woman's quality of life, leading to physical discomfort and emotional distress. [4] The pathogenesis of breast abscess often involves a bacterial infection, with bacteria entering the breast tissue through cracks or fissures in the nipple, which can occur due to trauma, improper latch during breastfeeding, or other irritative factors. [5] In the case of lactational abscesses, milk stasis plays a critical role by creating a nutrient-rich environment that facilitates bacterial growth and proliferation [6].

The most common causative organism identified in breast abscesses is Staphylococcus aureus, particularly methicillin-resistant strains (MRSA), though other bacteria, including Streptococcus species and Escherichia coli, can also be implicated [7,8]. The presence of these pathogens necessitates prompt and accurate identification through cultures and sensitivity testing. [9] Effective treatment hinges on the timely initiation of appropriate antibiotic therapy, which is crucial not only for the resolution of the abscess but also for the prevention of potential complications, such as systemic infection or recurrence of the abscess.[10] Understanding the underlying mechanisms and risk factors associated with breast abscesses is essential for healthcare providers to implement effective prevention and management strategies.

Materials and Methods

Study Area and Population

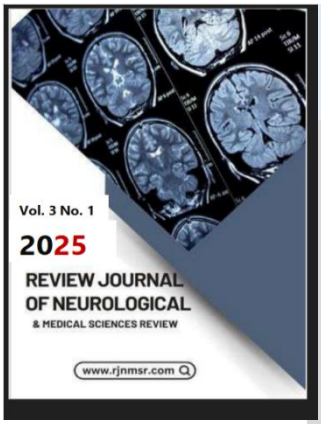
The study was conducted from November 2024 to February 2025 at the Amjad naeem Laboratory, Clinic, Rawalpindi, Pakistan. The study population comprised women visiting the clinic in Rawalpindi, Khyber Punjab, with breast abscess.

Sample Collection

Pus samples were collected from patients with breast abscess at different Hospitals in, Rawalpindi. Eighty-Eight pus samples were collected in sterile universal containers and transported to the laboratory following standard protocols.

Bacterial Isolation and Identification

The pus samples were subjected to Gram staining and cultured on Nutrient Agar and Mannitol Salt Agar (MSA) [1]. Inoculated plates were incubated at 37°C for 18-24 hours, and if no growth was observed, incubation was extended for another 24 hours. Colonies were examined for color, shape, size, margins, elevation, and hemolytic pattern. Isolated organisms were identified by spot tests, including catalase and coagulase tests [1].



Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

Antimicrobial Susceptibility Testing

Antimicrobial susceptibility testing of the isolated organisms was performed on Mueller-Hinton agar using the Kirby-Bauer disc diffusion technique [1]. The following panel of antimicrobials was used: ampicillin, ciprofloxacin, levofloxacin, amikacin, clarithromycin, sulfamethoxazole, streptomycin, and moxifloxacin. The tests were conducted, and results were interpreted according to the Clinical and Laboratory Standards Institute (CLSI) 2019 guidelines [1].

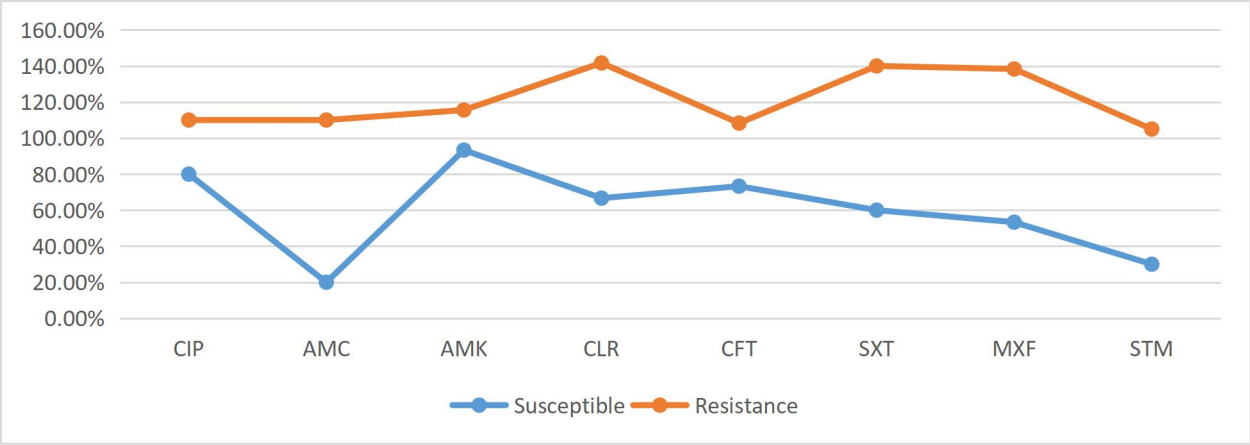
Results

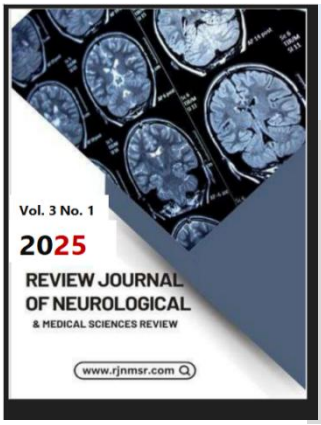
The mean age of the patients was 30.3 years (range 15-50 years). The majority of patients were in the 24-35 age group, and two patients were over 50 years of age. Out of 84 samples, 68 showed bacterial growth, and polymicrobial growth was observed in 3 out of 71 samples. The predominant isolates were Gram-positive bacteria, including *Staphylococcus aureus* and Streptococci. The Gram-negative bacteria isolated were *Escherichia coli* and *Pseudomonas aeruginosa*. *S. aureus* isolates showed the highest susceptibility to ciprofloxacin (80%), levofloxacin (80%), and amikacin (93.33%), while exhibiting high resistance to streptomycin (73.33%) and amoxicillin (93.33%).

P. aeruginosa isolates were most susceptible to ciprofloxacin (90%) and clarithromycin (85%) and most resistant to streptomycin (90%), amoxicillin (95%), and amikacin (90%). Streptococci isolates showed susceptibility to ciprofloxacin (60%), levofloxacin (90%), and clarithromycin (75%) and resistance to moxifloxacin (60%) and amikacin (60%).

E. coli isolates were susceptible to ciprofloxacin (90%) and clarithromycin (90%) and resistant to amikacin (90%), amoxicillin (95%), sulfamethoxazole (50%), and streptomycin (90%).

Percent frequency distribution of resistance and susceptible *S. aureus* towards a panel of antibiotics



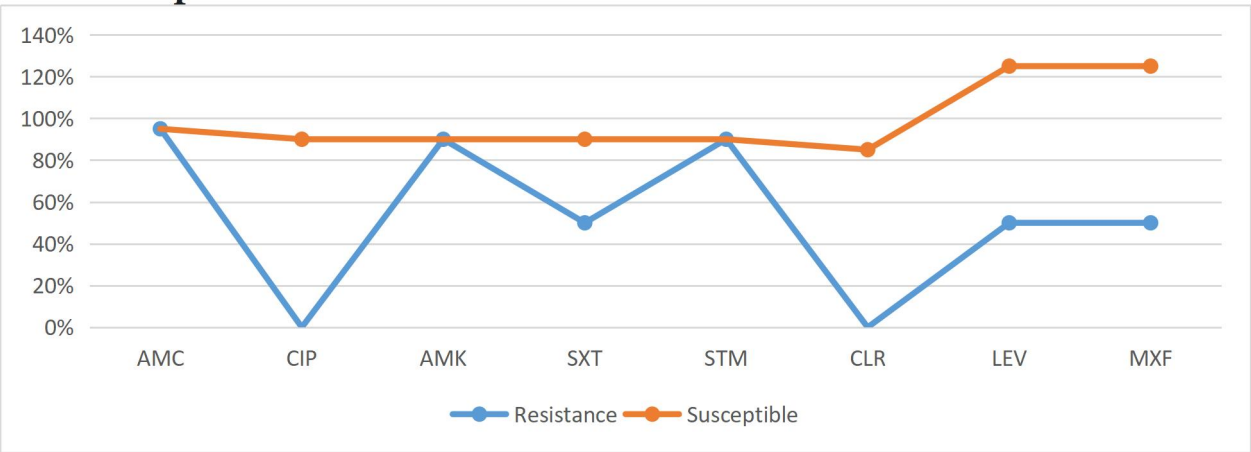


Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

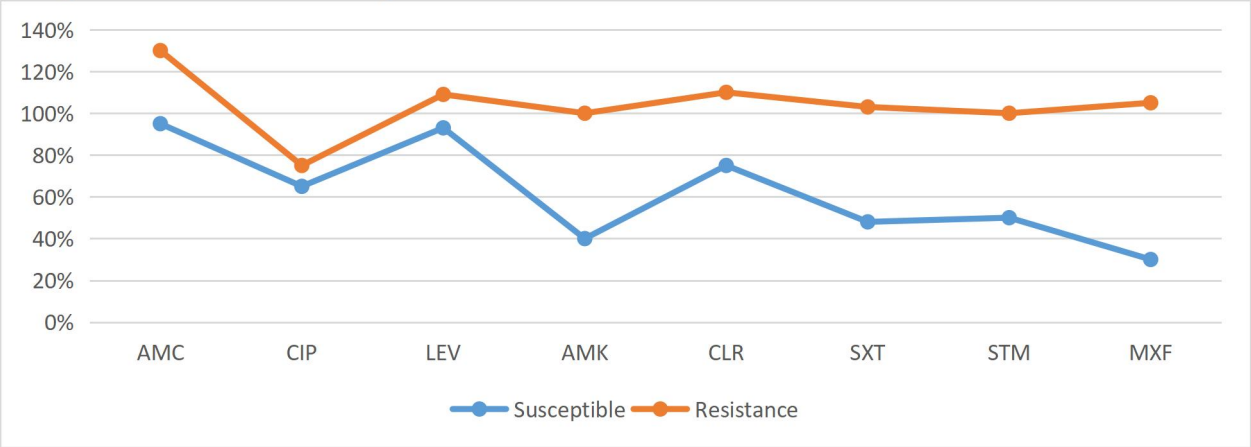
Review Journal of Neurological & Medical Sciences Review

E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

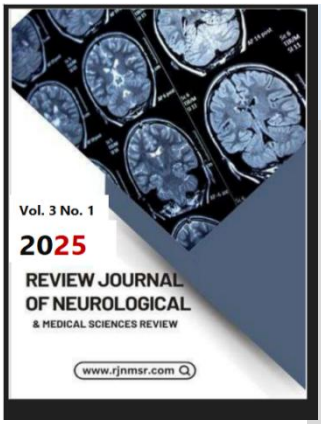
Frequency distribution of resistance and susceptible *P. Aeruginosa* towards A panel of antibiotics



Percent frequency distribution of resistant and susceptible of *streptococci* towards a panel of antibiotics



Percent frequency distribution of resistance and susceptible E.coli towards a panel of antibiotics



Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

Conclusion

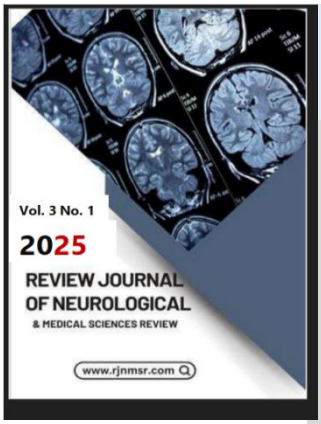
S. aureus was the predominant pathogen isolated from breast abscesses in both lactational and non-lactational women. The bacterial isolates associated with breast abscess were *S. aureus*, *E. coli*, Streptococci, and *P. aeruginosa*. Age and gender had little or no effect on susceptibility to breast abscess.

Recommendations

Continuous screening and surveillance of breast abscess patients are recommended to prevent serious infections. Similar studies should be conducted in other healthcare facilities to provide a comprehensive understanding of the pathogens causing breast abscess in the region.

References

1. P Pileri A Sartani MI Mazzocco S Giani S Rimoldi G Pietropaolo Management of Breast Abscess during BreastfeedingInt J Environ Res Public Health2022199576210.3390/ijerph19095762
2. F Zhou Z Li L Liu F Wang L Yu Y Xiang The effectiveness of needle aspiration versus traditional incision and drainage in the treatment of breast abscess: a meta-analysisAnn Med2023551222404510.1080/07853890.2023.2224045
3. P Jena S Duggal R Gur A Kumar T Bharara R Dewan Staphylococcus aureus in breast abscess-major culprit besides othersIndian J Med Sci2019711404
4. K Kataria A Srivastava A Dhar Management of Lactational Mastitis and Breast Abscesses: Review of Current Knowledge and PracticeIndian J Surg2012756430
5. Y Li XJ Ma XP He Clinical characteristics of lactational breast abscess caused by methicillin-resistant Staphylococcus aureus: hospital-based study in ChinaInt Breastfeed J20211618010.1186/s13006-021-00429-
6. JCM Townsend RD Beauchamp BM Evers KL Mattox Sabiston Textbook of Surgery21stElsevier - Health Sciences Division2016
7. R Ramakrishnan RV Trichur S Murugesan S Cattamanchi Analysis of the microbial flora in breast abscess: a retrospective cohort study conducted in the emergency departmentInt Surg J20174721437
8. W Branch-Elliman TH Golen HS Gold DS Yassa LM Baldini SB Wright Risk Factors for Staphylococcus aureus Postpartum Breast AbscessClin Infect Dis2012541717
9. E Boakes A Woods N Johnson Kadoglou Breast Infection: A Review of Diagnosis and Management PracticesEur J Breast Health201814313643
10. CLSI M100 Performance Standards for Antimicrobial Susceptibility Testing, 34th Edition2024https://clsi.org/standards/products/microbiology/documents/m100/
11. N Williams PR O'Connell A McCaskie Bailey & Love's Short Practice of Surgery27thCRC Press Taylor & Francis GroupGreat Britain20188667
12. A Alex E Bhandary KP McGuire Anatomy and Physiology of the Breast during Pregnancy and LactationAdv Exp Med Biol202012523710.1007/978-3-030-41596-9_1



Vol. 3 No. 2 (2025): April - June
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

13. KU Muslihuddin N Ahmad Z Jan A Shoaib Bacteriology and Antibiotic sensitivity of Breast AbscessJ Saidu Med Coll Swat1921921825
14. VS Antonello J Dallé MF Jimenez P Tramontini AG Reginatto Bacteriological characteristics of primary breast abscesses in patients from the community in the era of microbial resistanceRev Bras Ginecol Obstet202446e-rbgo3410.61622/rbgo/2024rbgo34
15. D Li J Li Y Yuan J Zhou Q Xiao T Yang Risk factors and prognosis of acute lactation mastitis developing into a breast abscess: A retrospective longitudinal study in ChinaPLoS ONE2022179e027396710.1371/journal.pone.0273967
16. A Moazzez RL Kelso S Towfigh H Sohn TV Berne RJ Mason Breast abscess bacteriologic features in the era of community-acquired methicillin-resistant Staphylococcus aureus epidemicsArch Surg20071429881
17. SD Kobayashi N Malachowa FR DeLeo Pathogenesis of Staphylococcus aureus AbscessesAm J Pathol20151856151827
18. N Lodhi N Khurshaidi R Soomro M Saleem SSU Rahman S Anwar Is our choice of empirical antibiotics appropriate for patients with methicillin resistant Staphylococcus aureus in breast abscess?Iran J Microbiol201810634853
19. ICMR- Antimicrobial Resistance Surveillance Network Annual report of January-2022 to December 2022https://main.icmr.nic.in/sites/default/files/guidelines/AMRSN_Annual_Report_2022.pdf
20. K Becker S Van Alen EA Idelevich N Schleimer J Seggewiß A Mellmann Plasmid-Encoded Transferable mecB-Mediated Methicillin Resistance in Staphylococcus aureusEmerg Infect Dis20182422428
21. S Lakhundi K Zhang Methicillin-Resistant Staphylococcus aureus: Molecular Characterization, Evolution, and EpidemiologyClin Microbiol Rev2018314e00020-1810.1128/CMR.00020-18
22. KA Benwan AA Mulla VO Rotimi Rotimi A Study of the Microbiology of Breast Abscess in a Teaching Hospital in KuwaitMed Princ Pract20112054226
23. Indian Network for Surveillance of Antimicrobial Resistance (INSAR) group, India. Methicillin resistant Staphylococcus aureus (MRSA) in India: prevalence & susceptibility patternIndian J Med Res201313723639PMCID
24. J Loscalzo A Fauci D Kasper S Hauser D Longo JL Jameson Harrison's Principle of Internal medicine1021st McGraw Hill Education202211868
25. K Pandit S Khanal P Adhikari S Adhikari SP Acharya Staphylococcal toxic shock syndrome in a lactating mother with breast abscess: A case reportAnn Med Surg202057133610.1016/j.amsu.2020.