Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

Resistance Pattern Of Pseudomonas Aeruginosa In Tertiary Care Hospitalised Patients

Zubair Shareef[1]
Department of Medical Laboratory Technology, Superior University, Lahore
Neha Fatima[2]
Department of Medical Laboratory Technology, Superior University, Lahore

Abstract

Background: The hospitals are burdened with a high frequency of nosocomial infections often caused by multiresistant nosocomial pathogens. Pseudomonas aeruginosa has emerged as one of the most problematic Gram-negative pathogens. Despite advances in medical and surgical care and introduction of wide variety of antimicrobial agents against having anti-pseudomonas activities. Objective(s): The present study aimed to investigate the frequency of Pseudomonas aeruginosa from the various clinical samples in Nawaz Sharif Social Security hospital,Lahore and to investigate resistance patterns against various antibiotics widely used for treatment. Methodology: A cross-sectional study is conducted at Nawaz Sharif Social Society hospital, Lahore from June 1 to September 30, 2024. A total of 99 patients who were suspected of bloodstream, burn, Ear discharge, sputum, urinary tract or surgical site nosocomial infections were enrolled consecutively. Specimens were collected and processed following standard microbiological procedures. Results: The study comprised 99 patients including male and female with all ages. A total of 55 males and 44 females are included. The highest percentages for both genders lie in the 21-40 age group, with 39% males and 14% females. The frequency and percentage distribution of different specimen types collected, with the most common being Right Ear Swab (39%), followed by Left Ear Swab (28%). Wound Swab, Sputum, and Puss accounted for 12%, 8%, and 7% of the specimens, respectively. Blood Culture and Right Bronchial tr were the least common, each representing 5% and 2% of the total, respectively. Conclusion(s): The

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

susceptibility patterns of isolates to various antimicrobial agents. A significant proportion of isolates were resistant to Ampicillin (83%) and Cefepime (51%), indicating high resistance to these drugs. In contrast, Imipenem + Meropenem demonstrated the highest sensitivity (85%), suggesting its potential effectiveness in treating infections caused by these isolates. Tobramycin, Piperacillin + Tazobactam, and Ceftazidime showed intermediate levels of resistance and sensitivity, with a notable proportion of isolates displaying neither sensitivity nor resistance to these agents.

Keywords: Pseudomonas aeruginosa, Multiresistance, Gram-negative, Ampicillin, Tobramycin, Piperacillin + Tazobactam

INTRODUCTION

Pseudomonas aeruginosa has emerged as an important pathogen during the past two decades. Resistance to antimicrobial agents is an increasing public health threat. It limits therapeutic options and leads to increased mortality and morbidity. It is quite challenging to completely eradicate this bacterium from infected people due to its wide range of virulence factors, high level of antibiotic resistance, and nutritional adaptability. Given the increasing resistance rates in P. aeruginosa, multidrug resistance can be expected to become more prevalent in many hospitals. Infections caused by P. aeruginosa are often severe and life threatening and are difficult to treat because of the limited susceptibility to antimicrobial agents.[1]

Pseudomonas Aeruginosa is a Gram-negative, Rod-shaped bacterium that possesses inherent resistance to multiple antibiotic classes. Including β-lactams. The metabolically versatile Gram-negative bacterium Pseudomonas aeruginosa inhabits humans and is important causative agent of nosocomial infections. P aeruginosa is ubiquitous and exists as a saprophyte in aqueous environments worldwide. P. aeruginosa has flagella and pili that are necessary for motility and respiratory infection, as they enable attachment to respiratory epithelium via respiratory mucins and the glycolipid. Bacterial adhesion to the respiratory epithelium is an essential step for infection and is accomplished by interactions between bacterial adhesions and host receptors.[2]

P Aeruginosa has a thin peptidoglycan layer and an outer membrane, which contributes to its antibiotic resistance. Has flagella, allowing it to move toward nutrients and away from harmful substances. There are hairline structures which are called Pili, known as organ of attachment. It can utilize a wide range of organic compounds as carbon sources, enabling it to thrive in diverse environments. They are pigments producing and oxidase positive.[3]

The pathogenesis of Pseudomonas is greatly attributed to its ability to develop widespread resistance to multiple antibiotics and disinfectants, and producing a number of virulence factors, which are colonization, Toxin and enzyme production, pigment production and capsule. P Aeruginosa uses various

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

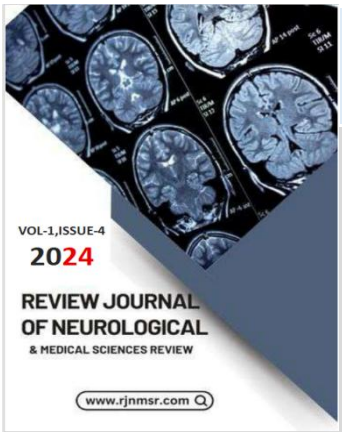
adhesions (like pili and fimbriae) to attach to host tissues and medical devices, facilitating colonization. Colonized Pseudomonas injects these toxins via a type 3 secretion system into host cells, which induces tissues injury by their cytotoxic activity .e.g. Exotoxins. The production of a polysaccharide capsule helps it evade phagocytosis by immune cells.[4]

When Pseudomonas aeruginosa enters the body, a series of immune reactions and physiological responses are triggered like immune response activation,recruiment of immune cells, Antibody production, complement system activation, In severe cases, particularly in immunocompromised individuals, *P.* aeruginosa can lead to systemic infections (like sepsis), resulting in a widespread inflammatory response and potentially leading to organ failure.[5]

P aeruginosa has a predilection for moist environments and can be found in water and soil and on plants, including fruits, vegetables, and flowers. The organism is rarely found as part of the microbial flora of healthy people; if colonization of healthy individuals occurs, the sites of colonization include the gastrointestinal tract and moist body sites, such as the throat, nasal mucosa, axillary skin, and perineum. P aeruginosa has a predilection for moist environments, there is a potential for the organism to be problematic in the hospital environment. Aqueous solutions used in medical care (e.g., disinfectants, soaps, irrigation fluids, eye drops, and dialysis fluids) may all become contaminated with P aeruginosa.P. aeruginosa is also frequently found in the aerators and traps of sinks, in respiratory therapy equipment, and on showerheads. P. aeruginosa may contaminate bronchoscopes and lead to outbreaks of infection. Long or artificial fingernails may also harbor P. aeruginosa and may be associated with outbreaks of P. aeruginosa infection.[6]

P aeruginosa is a common cause of nosocomial infections, manifesting as pneumonia, surgical site infections, urinary tract infections and bacteremia. It is estimated that P. aeruginosa has a prevalence of 7.1%–7.3% amongst all healthcare- associated infections. The most common site of P. aeruginosa infection is pneumonia, and it is the most common Gram-negative organism identified in nosocomial pneumonia. Healthcare- associated pneumonia (HAP) and ventilator-associated pneumonia (VAP) are a significant source of stress on the healthcare system, and they account for up to 22% of all healthcare-acquired infections .P. aeruginosa is a common cause of nosocomial urinary tract infections (UTI), particularly catheter-associated UTI (CAUTI).P. aeruginosa is a known complication of and important pathogen in burn patients.[7]

P. aeruginosa is an especially important pathogen in immunocompromised patients, particularly patients with neutropenia. It is a critically important pathogen in patients with hematological malignancies. Patients who have undergone transplantation are also at high risk of P. aeruginosa infection and are at increased risk of adverse outcomes. Patients with cystic fibrosis (CF), P aeruginosa is a critically important pathogen, and is a predominant cause of



Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

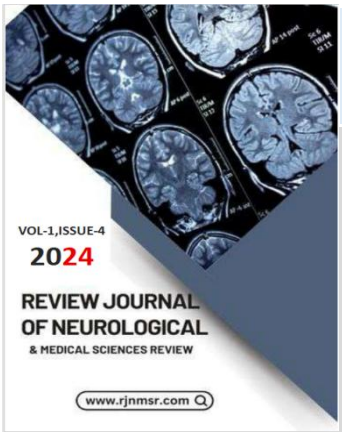
E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

morbidity and mortality. Complications of CF include chronic respiratory infections, structural lung disease and bronchiectasis, airflow obstruction, and death.[8]

P aeruginosa is a versatile pathogen that can cause a range of infections. The signs and symptoms depend on the site of infection, as well as the patient's overall health and immune status. In Respiratory tract infections, symptoms may include persistent cough, wheezing, shortness of breath, chest pain, and sputum production that may be green or bloody. In Urinary tract infections (UTIs), symptoms may include frequent urination, burning sensation during urination, cloudy or foul-smelling urine, and lower abdominal pain. In severe cases, there might be fever and back pain. In Skin and soft tissue infections, symptoms can include Infections can lead to redness, swelling, pain, and pus. Pseudomonas aeruginosa is known for causing infections in burn wounds. Pseudomonas aeruginosa infections can be particularly dangerous for people with weakened immune systems, chronic illnesses, or those who have undergone certain medical procedures. If you suspect an infection with this bacterium, it's important to seek medical attention for proper diagnosis and treatment.[9]

The laboratory diagnosis of Pseudomonas aeruginosa involves several steps to confirm its presence and identify its characteristics. The type of sample depends on the infection site: sputum, urine, wound swabs, blood, or other bodily fluids. A Gram stain of the specimen can reveal Gram-negative rods that are usually single, straight, and sometimes slightly curved. Pseudomonas aeruginosa can appear as small, straight rods or slightly curved rods aeruginosa is an obligate aerobe should be incubated aerobically at 35-37°C for 24-48 hours. In blood agar it shows beta-hemolytic grey moist colonies, in MacConkey agar it shows NLF colonies. In Culture smear and motility test, bacteria show GNB (gram negative bacilli) and motile. In biochemical identification, bacteria with catalase and oxidase test positive are p aeruginosa.[10]

P. aeruginosa is intrinsically resistant to the majority of antimicrobial agents due to its selective ability to prevent various antibiotic molecules from penetrating its outer membrane or to extrude them if they enter the cell. The antimicrobial groups that remain active include some fluoroquinolones (e.g. ciprofloxacin and levofloxacin), aminoglycosides (e.g. gentamicin, tobramycin and amikacin), some β-lactams (e.g. piperacillin-tazobactam, ceftazidime, cefepime, ceftolozane-tazobactam, ceftazidime-avibactam, imipenem, meropenem, doripenem) and polymyxins. [11]



Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

RESULTS

Specimen * Gender

		Female	Male	Total
Specimen	Blood Culture	2	3	5
	Left Ear Swab	13	15	28
	Pus	3	4	7
	Right Bronchial tree	0	2	2
	Right Ear Swab	16	22	38
	Sputum	4	3	7
	Wound Swabs	6	6	12
Total		44	55	99

Table 1: Distribution of different specimens across Gender

This table shows the distribution of different specimen types (e.g., Blood Culture, Ear Swab, Pus, etc.) across genders (Male and Female).

Each cell represents the count of specimens by type and gender, with a total of 99 cases.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.383[a]	6	.881
Likelihood Ratio	3.130	6	.792
N of Valid Cases	99		

a. 8 cells (57.1%) have expected count less than 5. The minimum expected count is .89.

The Pearson Chi-Square value is 2.383 with a significance level (p-value) of 0.881.

Interpretation: The high p-value (greater than 0.05) suggests that there is no statistically significant association between the specimen type and gender. The distribution of specimens across genders is likely due to chance.

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

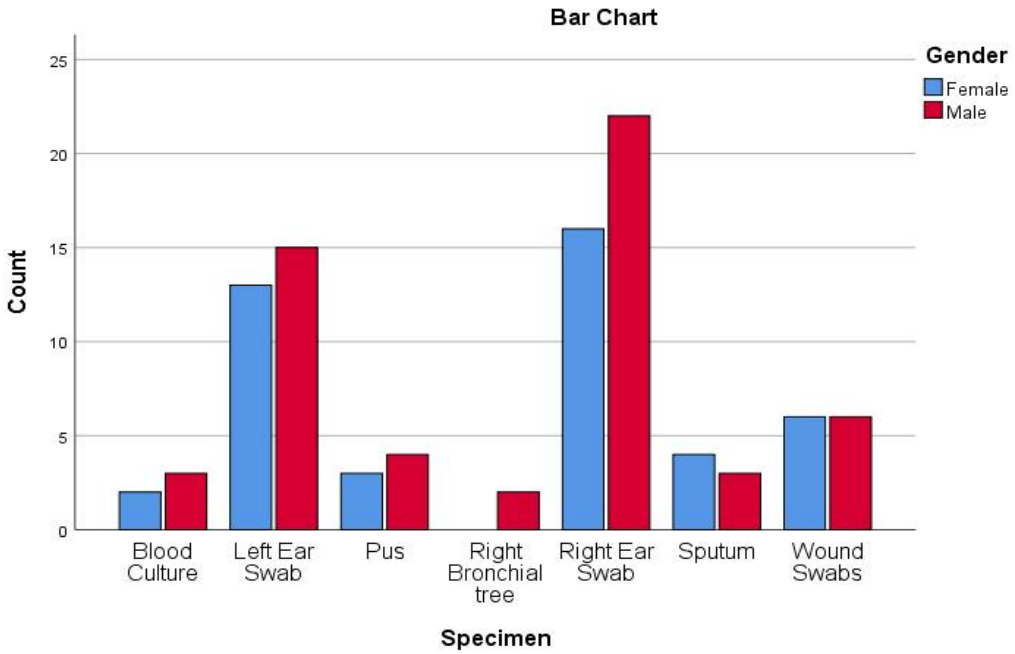


Figure 1:Chart showing Prevalance between Specimens across gender Wise

This bar chart compares the counts of specimens by gender, displaying how often each specimen type (e.g., Blood Culture, Ear Swab, etc.) was collected from males and females.

The data shows which specimen types are most common for each gender, with certain specimens like "Right Ear Swab" being more frequent for both genders. This helps visualize potential sampling or infection trends among genders.

Specimen * Tobramycin

		Resistant	No S&R	Resistant	sensitive	Total
Specimen	Blood Culture	0	2	1	2	5
	Left Ear Swab	0	11	4	13	28
	Pus	0	2	0	5	7
	Right Bronchial tree	0	2	0	0	2
	Right Ear Swab	1	9	8	20	38
	Sputum	0	4	1	2	7
	Wound Swabs	0	3	4	5	12
Total		1	33	18	47	99

Table 2: Anti-microbial susceptibility of Tobramycin in different Specimens

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

This table presents the counts for each specimen type's response to the antibiotic Tobramycin, categorized as "Resistant," "Sensitive," "No S&R" (likely indicating no sensitivity or resistance result).
It helps to visualize the distribution of antibiotic responses among different types of specimens.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.497[a]	18	.761
Likelihood Ratio	15.054	18	.658
N of Valid Cases	99		

a. 21 cells (75.0%) have expected count less than 5. The minimum expected count is .02.

The chi-square value is 13.497, with a p-value of 0.761.
Interpretation: Since the p-value is greater than 0.05, there is no significant association between specimen type and Tobramycin sensitivity. This suggests that the response to Tobramycin does not depend significantly on the type of specimen collected.

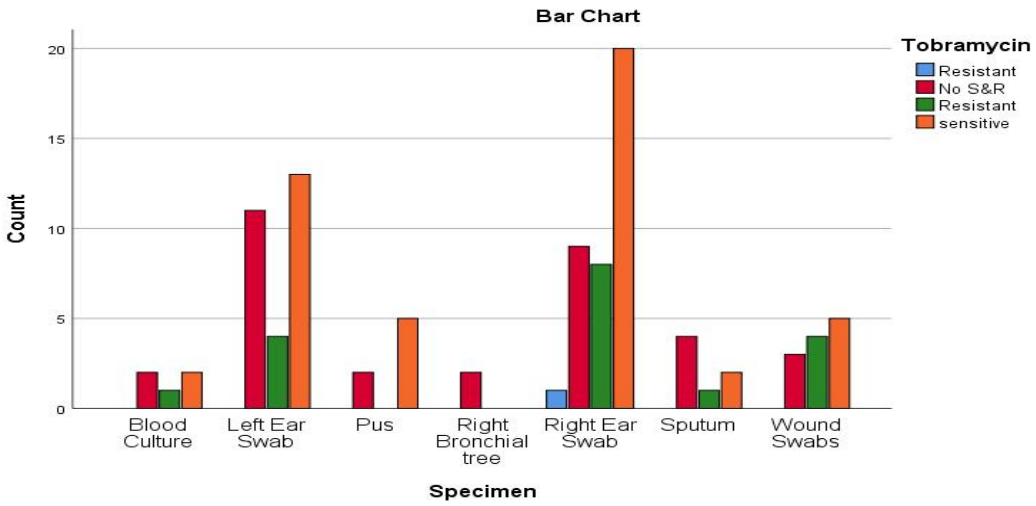
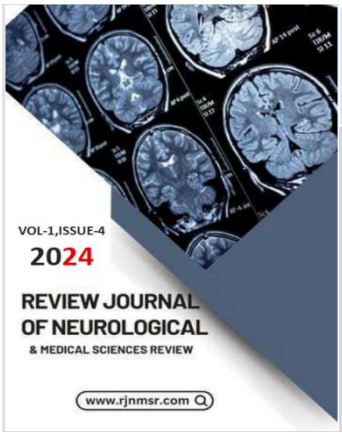


Figure 2: Chart showing Tobramycin susceptibility in Specimens
This chart shows the resistance or sensitivity of different specimens to Tobramycin. It categorizes responses as "Resistant," "Sensitive," or "No S&R" across specimen types.
This visualization helps determine which specimen types generally show higher resistance or sensitivity to Tobramycin, allowing for assessment of this antibiotic's effectiveness across different infections.



Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

Specimen * Ampicillin

		No S&R	Resistant	Total
Specimen	Blood Culture	0	5	5
	Left Ear Swab	7	21	28
	Pus	1	6	7
	Right Bronchial tree	0	2	2
	Right Ear Swab	4	34	38
	Sputum	2	5	7
	Wound Swabs	3	9	12
Total		17	82	99

Table 3:Anti-microbial susceptibility of Ampicillin in different specimens

This table lists the counts of different specimen types and their responses to Ampicillin (categorized as "Resistant" or "No S&R").

The purpose is to observe the pattern of resistance to Ampicillin across various specimen types

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.035[a]	6	.539
Likelihood Ratio	6.125	6	.409
N of Valid Cases	99		

a. 8 cells (57.1%) have expected count less than 5. The minimum expected count is .34.

The Pearson Chi-Square value is 5.035 with a p-value of 0.539.

Interpretation: The p-value is greater than 0.05, indicating no statistically significant association between the specimen type and Ampicillin resistance. Thus, Ampicillin resistance is not significantly related to the specimen type in this dataset.

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

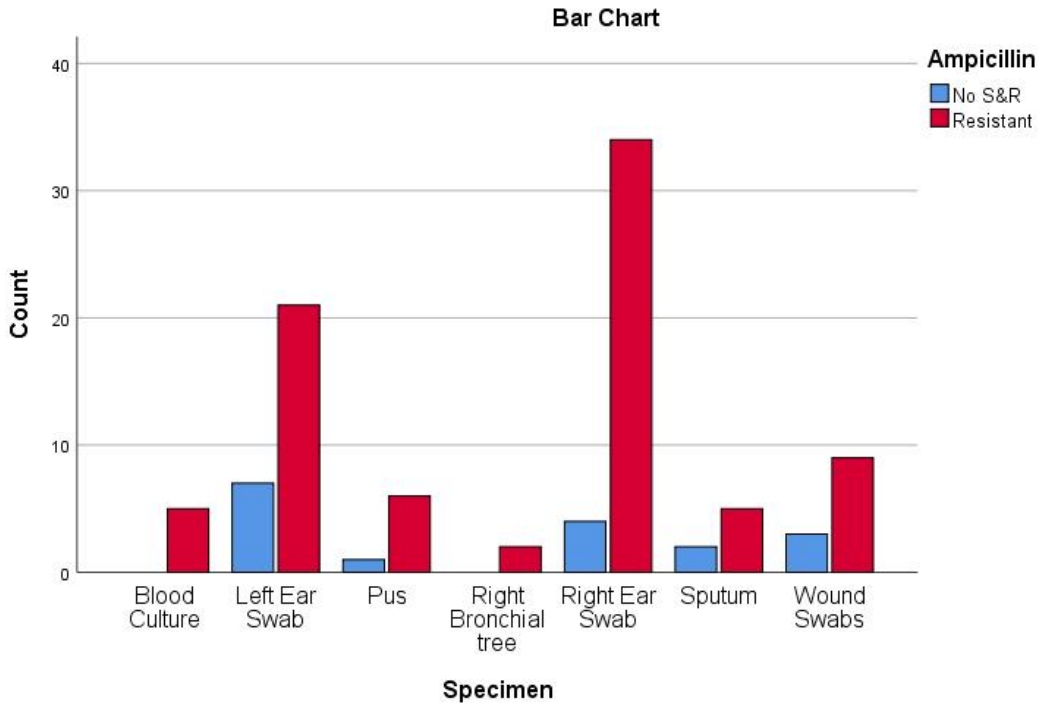


Figure 3: Chart Showing resistivity and sensitivity patterns of Ampicillin in different specimens

This chart categorizes specimen types by their response to Ampicillin, either "Resistant" or "No S&R."

By observing this chart, one can determine which specimen types show the highest resistance levels to Ampicillin, identifying patterns that could guide antibiotic selection for treatment.

Specimen * PiiperacillinTazobactum

		Intermediate	No S&R	Resistant	sensitive	Total
Specimen	Blood Culture	0	1	0	4	5
	Left Ear Swab	2	4	4	18	28
	Pus	3	0	1	3	7
	Right Bronchial tree	0	0	1	1	2
	Right Ear Swab	3	7	3	25	38
	Sputum	0	0	0	7	7
	Wound Swabs	2	0	5	5	12
Total		10	12	14	63	99

Table 4: Anti-microbial susceptibility of Piperacillin+Tazobactam in different specimens

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

This table shows counts of specimen types with various responses to Piperacillin+Tazobactam, categorized as "Intermediate," "No S&R," "Resistant," and "Sensitive."
This allows us to observe how different specimens respond to this antibiotic

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	28.922[a]	18	.049
Likelihood Ratio	29.020	18	.048
N of Valid Cases	99		

a. 24 cells (85.7%) have expected count less than 5. The minimum expected count is .20.

The chi-square value is 28.922 with a p-value of 0.049.
Interpretation: The p-value (slightly below 0.05) indicates a statistically significant association between specimen type and response to Piperacillin+Tazobactam. This result suggests that the type of specimen may impact sensitivity or resistance to this antibiotic, revealing a meaningful pattern.

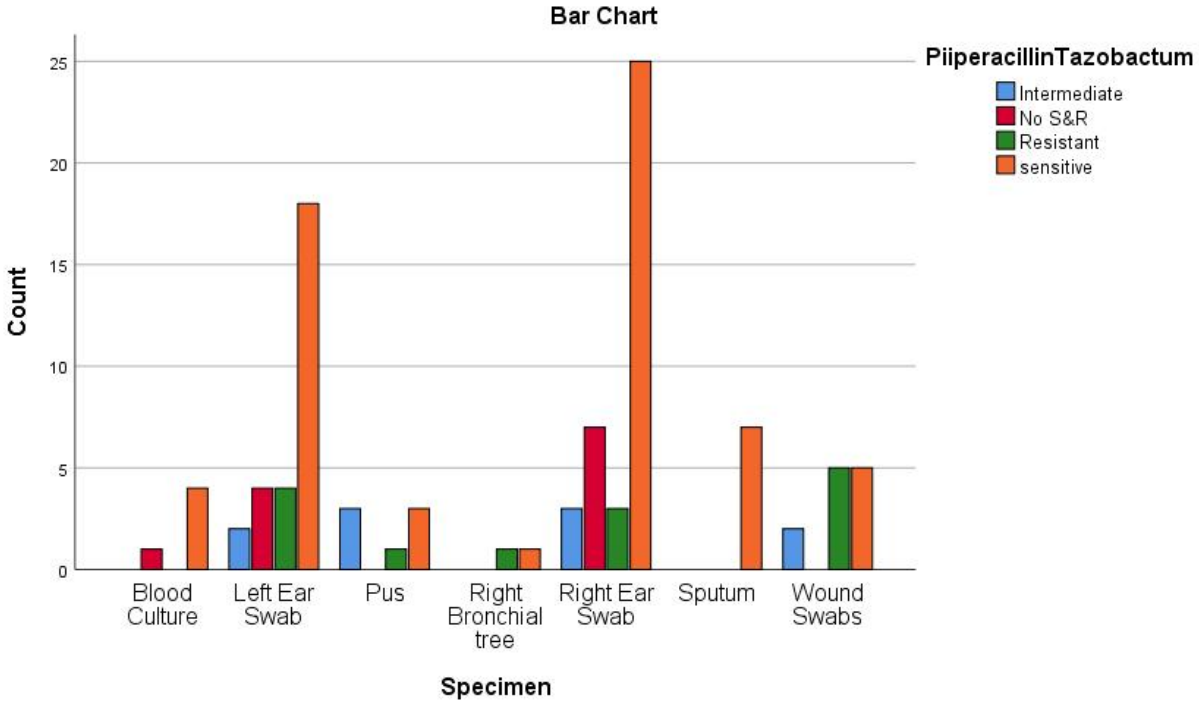


Figure 4: Chart showing resistivity and sensitivity patterns of Piperacillin+Tazobactam in different specimens
This bar chart categorizes responses to Piperacillin+Tazobactam as "Intermediate," "Resistant," "Sensitive," or "No S&R."

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

The chart indicates which specimen types respond better or worse to this antibiotic. Since the chi-square analysis found a significant association here, the differences in sensitivity levels across specimens are meaningful.

Specimen * Impenemmeropenem

		Intermediate	Neutral	No S&R	Not S&R	Resistant	sensitive	Sensitive	Total
Specimen	Blood Culture	0	0	1	0	0	4	0	5
	Left Ear Swab	0	0	4	0	0	24	0	28
	Pus	1	0	0	0	0	6	0	7
	Right Bronchial tree	0	0	0	0	0	2	0	2
	Right Ear Swab	1	0	4	1	0	31	1	38
	Sputum	0	0	0	0	0	7	0	7
	Wound Swabs	0	1	1	0	2	8	0	12
Total		2	1	10	1	2	82	1	99

Table 5: Anti-microbial Susceptibility of Imipenem/Meropenem in different specimens

This table contains counts of responses to Imipenem/Meropenem (categorized as Intermediate, Neutral, No S&R, etc.) by specimen type.

This layout provides a detailed breakdown of resistance and sensitivity patterns across specimens for these antibiotics.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.711[a]	36	.530
Likelihood Ratio	25.770	36	.897
N of Valid Cases	99		

a. 44 cells (89.8%) have expected count less than 5. The minimum expected count is .02.

The chi-square value is 34.711 with a p-value of 0.530.

Interpretation: Since the p-value is greater than 0.05, there is no significant association between the specimen type and response to

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about
Review Journal of Neurological & Medical Sciences Review
E(ISSN) : 3007-3073
P(ISSN) : 3007-3065

Imipenem/Meropenem. This indicates that the variation in response is not dependent on the type of specimen collected.

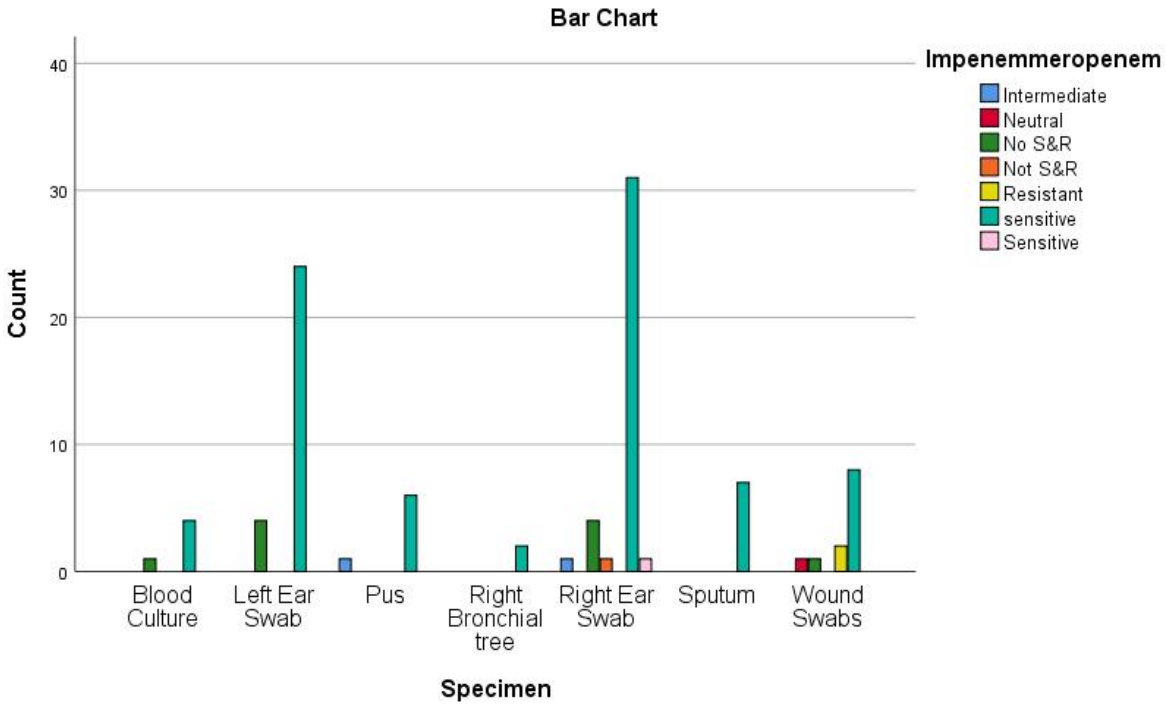


Figure 5: Chart Sowing resistivity and sessitivity patterns of Imipenem/Meropenem in different specimens

This chart breaks down specimen responses to Imipenem/Meropenem into categories like "Sensitive," "Resistant," and others.

Viewing these categories by specimen type helps assess how effective Imipenem/Meropenem might be across specimen types, although no significant association was found, implying consistent response rates.

Specimen * Ceftazidime

		Intermediate	No S&R	Resistant	sensitive	Total
Specimen	Blood Culture	0	0	3	2	5
	Left Ear Swab	0	5	13	10	28
	Pus	0	1	3	3	7
	Right Bronchial tree	0	1	1	0	2
	Right Ear Swab	4	6	18	10	38
	Sputum	0	0	5	2	7
	Wound Swabs	1	1	5	5	12
Total		5	14	48	32	99

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

Table 6: Anti-microbial susceptibility of Ceftazidime in different specimens

This table presents the counts of different specimen types with responses to Ceftazidime (e.g., Intermediate, No S&R, Resistant, Sensitive).

The objective is to analyze resistance or sensitivity to Ceftazidime across specimen types.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.084[a]	18	.843
Likelihood Ratio	15.488	18	.628
N of Valid Cases	99		

a. 22 cells (78.6%) have expected count less than 5. The minimum expected count is .10.

The chi-square value is 12.084 with a p-value of 0.843.

Interpretation: With a p-value greater than 0.05, there is no statistically significant association between specimen type and Ceftazidime response. The antibiotic response does not appear to vary meaningfully by specimen type in this dataset.

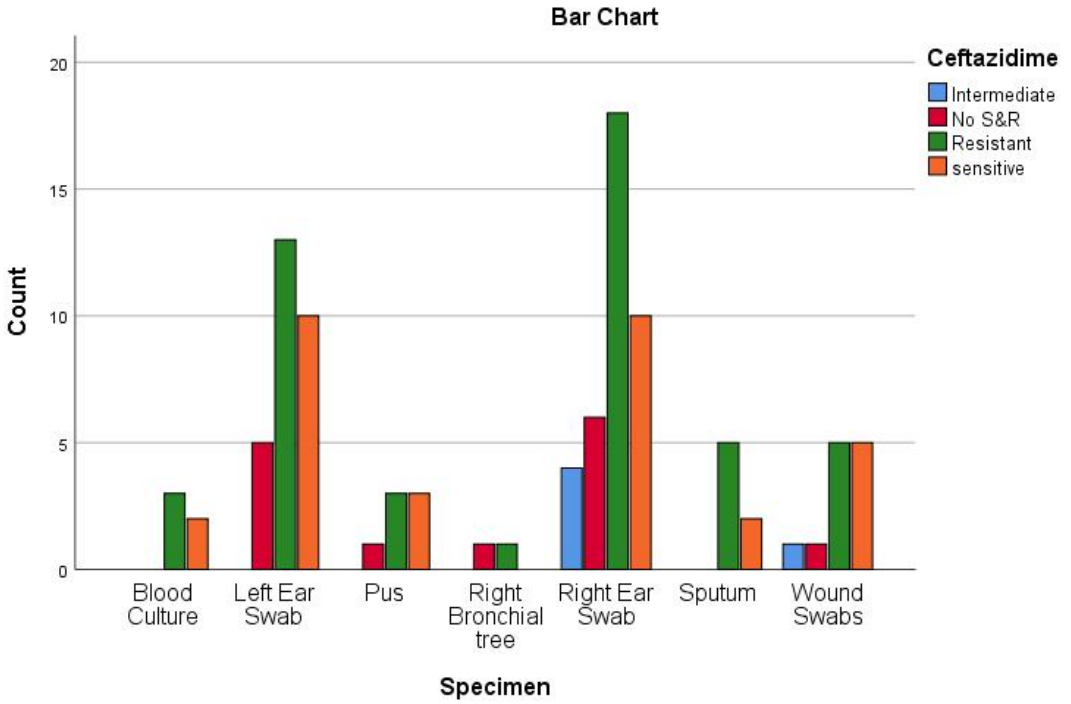
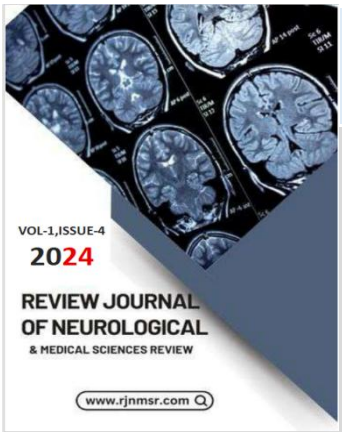


Figure 6: Chart showing resistivity and sensitivity patterns of Ceftazidime in different specimens



Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

This chart shows the sensitivity and resistance distribution for Ceftazidime among different specimen types.
The lack of a significant association suggests similar response patterns across specimen types, but this chart visually presents which specimen types are more prone to resistance to Ceftazidime.

Specimen*Cefepime

		Intermediate	Neutral	No S&R	Resistant	sensitive	Total
Specimen	Blood Culture	0	0	0	2	3	5
	Left Ear Swab	0	0	4	9	15	28
	Pus	0	0	1	5	1	7
	Right Bronchial tree	0	0	0	1	1	2
	Right Ear Swab	1	1	6	11	19	38
	Sputum	0	0	0	4	3	7
	Wound Swabs	0	0	0	7	5	12
Total		1	1	11	39	47	99

Table 7: Anti-microbial Susceptibility of Cefepime in different specimens

This table shows the distribution of specimen types with various responses to Cefepime, classified as Intermediate, Neutral, No S&R, Resistant, and Sensitive.
It is used to compare the sensitivity and resistance of specimens to Cefepime.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.304[a]	24	.939
Likelihood Ratio	17.861	24	.810
N of Valid Cases	99		

a. 30 cells (85.7%) have expected count less than 5. The minimum expected count is .02.

The chi-square value is 14.304 with a p-value of 0.939.
Interpretation: A p-value greater than 0.05 indicates no significant association between specimen type and response to Cefepime. The results suggest that response to Cefepime does not vary by specimen type.

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

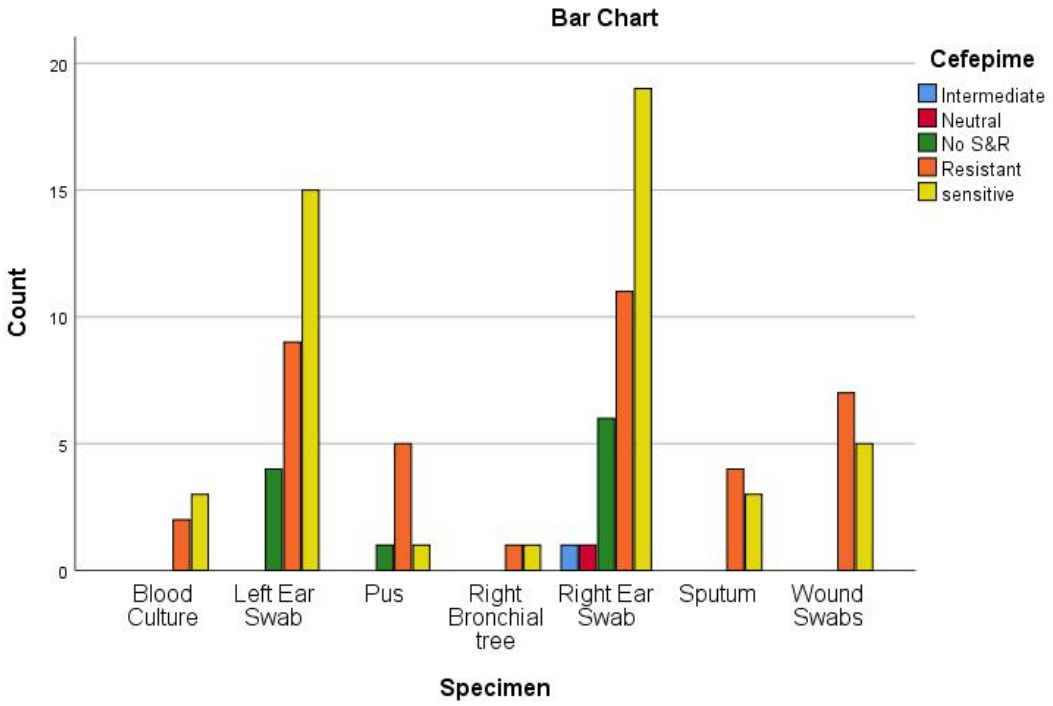


Figure 7:Chart showing resistivity and sensitivity patterns of Cefepime in different specimens

This chart represents the response distribution for Cefepime by specimen type, displaying "Sensitive," "Resistant," and other response types.

This chart helps evaluate which specimen types exhibit higher sensitivity to Cefepime. Although the chi-square test found no significant association, visualizing this data provides a quick overview of Cefepime's general effectiveness across specimens.

Discussion

The findings indicate that resistance to antibiotics varies across specimen types. However, only Piperacillin+Tazobactam showed a statistically significant association with specimen type. This suggests that the effectiveness of Piperacillin+Tazobactam may depend on the specific infection site or type of pathogen associated with each specimen.

For most antibiotics tested, including Tobramycin, Ampicillin, Imipenem/Meropenem, Ceftazidime, and Cefepime, there was no statistically significant variation in sensitivity based on specimen type. This uniformity suggests that these antibiotics tend to have consistent effectiveness across different types of specimens, which can simplify treatment choices in clinical settings.

Since Piperacillin+Tazobactam exhibited sensitivity variations across specimen types, it may be a valuable targeted option when specimen type

Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

information is available. Tailoring this antibiotic's use to the type of specimen could improve treatment outcomes.

The analysis found no significant association between gender and specimen type, indicating that infections requiring specimen collection are distributed fairly equally between males and females. This finding suggests that gender does not significantly influence the type of specimens collected or the distribution of infections.

Overall, this research provides valuable guidance for antibiotic selection, as it highlights which antibiotics are broadly effective and which may require specimen-specific consideration. Such insights could help reduce the overuse of broad-spectrum antibiotics by encouraging more targeted treatment, ultimately helping to manage antibiotic resistance.

Conclusion

Each analysis provides insights into the relationship between specimen types and their responses to various antibiotics. Only the Specimen and Piperacillin+Tazobactam Crosstab shows a statistically significant association, suggesting that specimen type may influence the response to Piperacillin+Tazobactam. The other analyses indicate no significant relationships, implying that antibiotic response is independent of specimen type in those cases. This study emphasizes the importance of understanding specimen-specific antibiotic responses. While most antibiotics tested are broadly effective across specimens, Piperacillin+Tazobactam' s sensitivity depends on specimen type. Clinical use of antibiotics should incorporate these findings to optimize treatment and combat resistance, thus contributing to more effective and targeted infectious disease management.

Acknowledgements

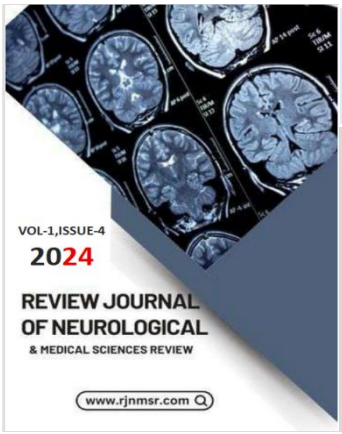
We express sincere thanks to our supervisor Mr.Zubair Shareef for his greatly valued contributions.

Conflict of Interest

Declared none

References

1. Senthamarai S, Sivasankari S, Anitha C, Somasunder V, Kumudhavathi M, Amshavathani S, et al. Resistance pattern of Pseudomonas aeruginosa in a tertiary care hospital of Kanchipuram, Tamilnadu, India. Journal of clinical and diagnostic research: JCDR. 2014;8(5):DC30.
2. Wiehlmann L, Wagner G, Cramer N, Siebert B, Gudowius P, Morales G, et al. Population structure of Pseudomonas aeruginosa. Proceedings of the national academy of sciences. 2007;104(19):8101-6.
3. Weiss R. The structure and occurrence of pili (fimbriae) on Pseudomonas aeruginosa. Microbiology. 1971;67(2):135-44.
4. Liao C, Huang X, Wang Q, Yao D, Lu W. Virulence factors of Pseudomonas aeruginosa and antivirulence strategies to combat its drug resistance. Frontiers in cellular and infection microbiology. 2022;12:926758.



Vol. 1 No. 4 (2024): October - December
https://rjnmsr.com/index.php/rjnmsr/about

Review Journal of Neurological & Medical Sciences Review

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

5. Lavoie EG, Wangdi T, Kazmierczak BI. Innate immune responses to Pseudomonas aeruginosa infection. Microbes and infection. 2011;13(14-15):1133-45.
6. Crone S, Vives-Flórez M, Kvich L, Saunders AM, Malone M, Nicolaisen MH, et al. The environmental occurrence of Pseudomonas aeruginosa. Apmis. 2020;128(3):220-31.
7. Spiers AJ, Buckling A, Rainey PB. The causes of Pseudomonas diversity. Microbiology. 2000;146(10):2345-50.
8. Bodey GP, Bolivar R, Fainstein V, Jadeja L. Infections caused by Pseudomonas aeruginosa. Reviews of infectious diseases. 1983;5(2):279-313.
9. Zhuo H, Yang K, Lynch SV, Dotson RH, Glidden DV, Singh G, et al. Increased mortality of ventilated patients with endotracheal Pseudomonas aeruginosa without clinical signs of infection. Critical care medicine. 2008;36(9):2495-503.
10. Tang Y, Ali Z, Zou J, Jin G, Zhu J, Yang J, et al. Detection methods for Pseudomonas aeruginosa: history and future perspective. Rsc Advances. 2017;7(82):51789-800.
11. Shah DA, Wasim S, Abdullah FE. Antibiotic resistance pattern of Pseudomonas aeruginosa isolated from urine samples of Urinary Tract Infections patients in Karachi, Pakistan. Pakistan journal of medical sciences. 2015;31(2):341..