Original Article

A Retrospective Study on Antibiotic Susceptibility Pattern of Detected Bacteria

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ABSTRACT

Background: Antibacterials are the most imperative weapons in our hands, accounting for the majority of ambulatory care prescriptions. Irrational use of antibiotics in developing countries like India have led to emergence of antibiotic resistance which can lead to treatment failure, increase cost burden, lack of availability of drug molecule to treat life threatening infections and affect patient's quality of life significantly. **Aim:** To check the Antibiotic Susceptibility Pattern for commonly detected bacteria in Gandhinagar and Ahmedabad. **Objectives:** To identify the spectrum of organisms responsible for infection in our geographical area and to evaluate the pattern of antibiotic susceptibility of those organisms. **Methodology:** A Retrospective Observational study was carried out for a period of 1 year (January 2017 to December 2017). A total of 150 microbial culture sensitivity test reports were collected from different laboratories. The data collected from different laboratories on the basis of inclusion and exclusion criteria and were entered in MS Excel. Data was represented in frequency and percentage table and using graphical representation. **Results:** Total 150 reports of culture sensitivity test were obtained. Urine (78%) was widely collected sample. *E. coli* (46.7%) was the dominant bacterial species. Cephalosporin was the most resistant class of antibiotic. **Conclusion:** Periodic review of antibiotic sensitivity pattern at hospital level and at state level is of utmost importance for the patient's economical and health benefit.

Key words: Antibiotics, Antibacterial Resistance, Susceptibility Pattern, Antibiogram, Cephalosporin.

INTRODUCTION

Antibiotics are the key drugs generally used for the treatment of various infections and are the most commonly prescribed drugs. They are the second leading drugs prescribed according to the national ambulatory medical care.[1]

At 12.9×10^9 units of antibiotics consumed in 2010, India was the largest consumer of antibiotics for human health. Although the per capita consumption of antibiotics in India (10.7 units per capita) was lower than that seen in many other countries (e.g. 22 units per capita in United States of America), the overall population and infection load led to higher total consumption.[2]

In 2016, India consumed more than 260 crore packs or Rs.15,000 crore worth of antibiotics, a statistic that puts it among the world's largest consumers of antibiotics. And in this worrisome pecking-order Goa (10.5), Delhi (9), Uttar Pradesh (7.2), Punjab (7.2) and Kerala (6.7) top the list of antibiotics consumers in the country, with consumption patterns higher than the national average of about 6 packs per 1000 people per day.[3]

One of the studies has published that 53 per cent Indians take antibiotic drugs without a doctor's prescription and up to 48 percent want to change their physician. According to initiatory study conducted by the World Health Organization (WHO), 16 percent physicians prescribe antibiotics to patients with non-specific fever.[1]

Eventually, the risk of antibiotic-resistant organisms is increased. Therefore, choice of suitable antibiotics is a major determinant of appropriate therapy and prevention of chronic complications.[4]

Even before the extensive use of penicillin,

DOI: 10.5530/ijopp.12.3.39

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some observations suggested that bacteria could destroy it by enzymatic degradation. Within seven years of penicillin use, 50% of hospital *Staphylococcus aureus* isolates were resistant. Mechanisms of bacterial resistance to antimicrobial agents are enzyme inactivation, altered receptors, and altered antibiotic transport.[1,5,6]

Staphylococcus aureus is one of the most common human pathogens with ability to cause a wide range of infections. On an average 20-40% of the adults are carriers of *S. aureus* in the anterior nares. The emergence of community-acquired and hospital acquired methicillin resistant *S. aureus* (MRSA) has led to increasing in cases of invasive infections.[7]

The emergence antibiotic resistance and its rapid spread of among pathogenic bacterial isolates are considered as grave threats to the public health worldwide. During the last few decades, multidrug-resistant Gram negative bacterial strains such as *Acinetobacter baumannii*, *E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa,* and Gram-positive methicillin-resistant *Staphylococcus aureus* (MRSA) were increasingly associated with pus infections under hospital settings due to extensive mis prescription and inadequate dose regimen of antibiotics.[8]

The selection of antimicrobial drugs for empiric therapy is best based on the susceptibility pattern of the species isolated in a given area and, if determined, can update the prevailing efficiency of commonly prescribed antibiotics. The knowledge of the susceptible organism and the resistance patterns in the local area is imperative for optimizing treatment and minimizing the emergence of resistant strains.[9]

Almost 50 years ago, *Pseudomonas aeruginosa* was rarely considered as a real pathogen. In the 1970s it was recognized as the microorganism associated with bacteria in the neutropenic host. Nowadays, it is among the most common pathogens involved in nosocomial infections. Hospital reservoirs of the microorganism include respiratory equipment, antiseptics, soaps, sinks, mops and physiotherapy and hydrotherapy pools. It was also noted that *Pseudomonas aeruginosa* bacteremia is associated with higher mortality than other gram negative bacteremia. Resistance in pathogenic bacteria against antibiotics is a challenge for our clinicians for the management of various infections.[10]

One of the most important activities performed by a clinical microbiology laboratory is the reporting of cumulative and ongoing summaries of institutional patterns of antimicrobial susceptibilities, which are called antibiograms. This article explains how to make an antibiogram, its presentation, and its role in empiric antibiotic policy.[11]

The hospital antibiogram is a periodic summary of antimicrobial susceptibilities of local bacterial isolates submitted to the hospital's clinical microbiology laboratory. Antibiograms are often used by clinicians to assess local susceptibility rates, as an aid in selecting empiric antibiotic therapy, and in monitoring resistance trends over time within an institution. Antibiograms can also use to compare susceptibility rates across institutions and track resistance trends.[11]

Therefore this study was designed to find out the antibiotic resistance and selection of proper empirical therapy for treating the detected bacteria.

Aim

To check the Antibiotic Susceptibility Pattern for commonly detected bacteria in Gandhinagar and Ahmedabad.

Objectives

1. To identify the spectrum of organisms responsible for infection in our geographical area
2. To evaluate the pattern of antibiotic susceptibility of those organisms.

MATERIALS AND METHODS

Study Design: Retrospective Observational Study

Study Site: This study was conducted at various pathology laboratories of Gandhinagar and Ahmedabad

Study Duration: Data from January 2017 to December 2017 was collected

Sample Size: 150 patients

Study Data: Patient data relevant to the study was obtained from the pathology laboratories in form of MS-Excel files.

Inclusion Criteria

- Bacteriological proven infection with lab data showing positive reports against micro organisms

Exclusion Criteria

- Duplicate samples with differing sensitivities.
- If samples grew multiple pathogens.
- Samples with less growth of bacterial colonies.

Statistical Analysis

The data was analyzed using descriptive statistics namely total numbers and percentage wherever applicable. Microsoft word, Microsoft Excel and Statistical Package for Social Service (SPSS) version 25, USA have been used.

RESULTS AND DISCUSSION

After obtaining ethical clearance from Institutional Ethics Committee and permission from various pathology laboratories in Gandhinagar and Ahmedabad, a total of 150 reports were collected for the study. The gender wise distribution of study population has been shown in Table 1.

Culture Specimen

In our study, urine (78%) was widely collected specimen while cerebrospinal fluid (0.7%) was least collected and the other collected specimens are shown in Table 2.

These results are comparable with the study conducted by Tadvi J *et al.*[12] in which blood (36%) was the largely collected sample followed by wound (29.33%), pus (22.67%). The least collected sample was bile (0.67%). These results are also comparable to results had been obtained in study reported by Arora *et al.*[13]

Table 1: Gender wise Distribution of Study Population.

Gender	No.	Percentage (%)
Male	84	56
Female	66	44
Total	150	

Table 2: Specimen Collected.

Specimen	Frequency	Percentage (%)
Blood	3	2.0
Cerebrospinal Fluid	1	0.7
Endotracheal Secretion	3	2.0
Sputum	23	15.3
Stool	3	2.0
Urine	117	78.0
Total	150	100.0

Bacteria Isolated

In our study, *Escherichia coli* (46.7%) was detected in highest number of isolates, other bacteria isolates are shown in Table 3.

Our findings correlate with B. Chitra *et al.*[14] who reported *Klebsiella pneumonia* was isolated in highest numbers, followed by *E.coli, Enterococcus faecalis* and *Streptococcus aureus*. In another study conducted by Ravi Pathiyil Shankar *et al.*[15] *H. influenza* was the dominant bacterial species followed by *E. coli, K. pneumoniae*, *S. aureus*.

Cross tabulation form of specimen collected and bacteria detected is shown in Table 4.

Tables 5, 6, 7, 8, 9, 10, 11 and 12 depicts the antibiotic susceptibility pattern (Resistance, Intermediate and Sensitive) for most of the antibiotics for isolates of *Escherichia coli, Enterococcus faecalis, Klebsiella pneumonia*, *Morexella catarrhalis*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcus Aureua* and *Shigella dysenteriae* respectively.

According to study conducted by Chitra *et al.*[14] the sensitivity pattern data revealed that *E. coli* were highly sensitive to Amikacin, followed by Klebsiella to Amikacin, and Pseudomonas to Meropenem. The sensitivity pattern of the antibiotics in our study were found to be similar to the study conducted by Bijoy Thomas *et al.*[16]

Table 3: Bacteria Isolated.

Organism	Frequency	Percentage (%)
Enterococcus faecalis	1	0.7
Escherichia coli	70	46.7
Klebsiella pneumoniae	22	14.7
Morexella catarrhalis	1	0.7
No growth of Pathogenic bacteria Seen	34	22.7
Proteus mirabilis	1	0.7
Pseudomonas aeruginosa	19	12.7
Shigella dysenteriae	1	0.7
Staphylococcus Aureua	1	0.7
Total	150	100.0

Table 4: Specimen collected and bacteria detected.

	E. faecalis	*E. coli*	*Klebsiella pneumoniae*	*Morexella catarrhalis*	No growth of Pathogenic bacteria Seen	*Proteus mirabilis*	*Pseudomonas aeruginosa*	*Shigella dysenteriae*	*S. Aureus*	Total
Blood	0	0	0	0	3	0	0	0	0	3
Cerebrospinal Fluid	0	0	0	0	1	0	0	0	0	1
Endotracheal Secretion	0	1	1	0	1	0	0	0	0	3
Sputum	0	1	2	1	16	0	2	0	1	23
Stool	0	2	0	0	0	0	0	1	0	3
Urine	1	66	19	0	13	1	17	0	0	117
Total	1	70	22	1	34	1	19	1	1	150

Table 5: Antibiotic Sensitivity pattern of *Escherichia coli*.

Name of Antibiotics	No. of Isolates	R	I	S	Name of Antibiotics	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	70	62	0	8	Tobramycin	70	19	2	49
Amoxycillin	61	52	0	9	Kanamycin	50	13	0	37
Penicillin G	8	7	0	1	Minocycline	66	41	1	24
Piperacillin	68	34	0	34	Doxycycline	17	12	1	4
Ticarcillin	9	9	0	0	Ciprofloxacin	70	52	1	17
Oxacillin	3	3	0	0	Norfloxacin	60	49	0	11
Cephalexin	67	49	0	18	Pefloxacin	50	32	0	18
Cefadroxil	61	44	0	17	Ofloxacin	70	55	1	14
Cefaclor	56	40	0	16	Lomefloxacin	59	37	0	22
Cefuroxime	70	51	0	19	Levofloxacin	70	54	1	15
Cefotaxime	70	52	0	18	Moxyfloxacin	69	50	1	18
Ceftriaxone	70	48	0	22	Gemifloxacin	56	37	0	19
Ceftrizoxime	61	44	0	17	Gatifloxacin	51	37	0	14
Ceftazidime	70	50	0	20	Nalidixic Acid	9	9	0	0
Cefixime	69	49	0	20	Trimethoprim	9	7	0	2
Cefoperazone	69	46	0	23	Sulfonamide	59	38	0	21
Cefpirome	55	31	0	24	Co-trimoxazole	18	9	0	9
Cefepime	70	32	0	38	Vancomycin	61	14	0	47
Cefdinir	3	3	0	0	Chloramphenicol	65	16	0	49
Cefoxitin	11	8	0	3	Nitrofurantoin	64	2	2	60
Cephalothin	3	3	0	0	Colistin	64	2	0	62
Imipenem	70	2	0	68	Polymyxin B	12	1	0	11
Meropenem	70	2	0	68	Clindamycin	12	12	0	0
Ertapenem	20	2	0	18	Linezolid	60	12	0	48
Doripenem	15	0	1	14	Tigecycline	67	33	0	34
Amikacin	70	5	2	63	Fosfomycin	11	2	0	9
Gentamicin	70	20	2	48	Lincomycin	2	2	0	0
Netilmicin	70	5	0	65	Teicoplanin	12	12	0	0
Ampicillin + Sulbactam	70	23	2	45	Piperacillin + Clavulanic Acid	5	0	1	4
Amoxicillin + Clavulanic Acid	70	47	1	22	Cefotaxime + Sulbactam	20	3	1	16
Piperacillin + Tazobactum	70	16	3	51	Cefoperazone + Sulbactam	70	3	1	66
Ceftriaxone + Sulbactam	58	13	1	44	Ceftriaxone + Tazobactum	2	0	1	1

Table 6: Antibiotic Sensitivity pattern of Enterococcus faecalis.

Names of Antibiotics	No. of isolates	R	I	S
		No.	No.	No.
Cephalexin	1	1	0	0
Cefadroxil	1	1	0	0
Cefaclor	1	1	0	0
Cefuroxime	1	1	0	0
Cefazolin	1	1	0	0
Cefpodomie	1	1	0	0
Cefprozil	1	1	0	0
Cefotaxime	1	1	0	0
Ceftriaxone	1	1	0	0
Ceftrizoxime	1	1	0	0
Ceftazidime	1	1	0	0
Cefixime	1	1	0	0
Cefoperazone	1	1	0	0
Cefpirome	1	1	0	0
Cefepime	1	1	0	0
Cefdinir	1	1	0	0
Cefoxitin	1	1	0	0
Cephalothin	1	1	0	0
Meropenem	1	1	0	0
Clindamycin	1	1	0	0
Cotrimoxazole	1	1	0	0

Table 7: Antibiotic Sensitivity pattern of *Klebsiella pneumonia*.

Name of Antibiotics	No. of Isolates	R	I	S	Name of Antibiotics	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	21	20	0	1	Kanamycin	17	10	0	7
Amoxycillin	20	17	0	3	Azithromycin	4	3	0	1
Penicillin G	3	3	0	0	Erythromycin	2	2	0	0
Cloxacillin	2	2	0	0	Clarithromycin	2	2	0	0
Piperacillin	20	13	0	7	Minocycline	20	8	0	12
Ticarcillin	2	2	0	0	Doxycycline	4	2	0	2
Cefadroxil	21	18	0	3	Ciprofloxacin	21	15	0	6
Cefaclor	20	16	0	4	Norfloxacin	18	12	0	6
Cefuroxime	22	18	0	4	Pefloxacin	16	11	0	5
Cefazolin	21	18	0	3	Ofloxacin	21	18	0	3
Cefpodomie	4	4	0	0	Lomefloxacin	17	11	0	6
Cefprozil	4	4	0	0	Levofloxacin	19	13	0	6
Cefotaxime	22	17	0	5	Sparfloxacin	18	12	0	6
Ceftriaxone	22	16	0	6	Moxyfloxacin	20	15	0	5
Ceftrizoxime	21	16	0	5	Gemifloxacin	17	10	0	7
Ceftazidime	22	15	0	7	Gatifloxacin	16	10	0	6
Cefixime	22	16	0	6	Sulfonamide	17	11	0	6
Cefoperazone	21	14	0	7	Co-trimoxazole	4	3	0	1
Cefpirome	20	14	0	6	Vancomycin	19	12	0	7
Cefepime	22	14	0	8	Chloramphenicol	19	16	0	3
Cefdinir	4	4	0	0	Nitrofurantoin	18	2	0	16
Cefoxitin	3	3	0	0	Colistin	20	0	0	20
Imipenem	22	6	0	16	Polymyxin B	4	0	0	4
Meropenem	22	8	0	14	Clindamycin	3	3	0	0
Ertapenem	6	2	0	4	Linezolid	19	3	0	16
Doripenem	4	1	0	3	Tigecycline	20	8	0	12
Amikacin	21	7	0	14	Teicoplanin	3	3	0	0
Gentamicin	21	11	0	10	Aztreonem	20	12	0	8
Netilmicin	21	7	0	14	Mupirocin	2	2	0	0
Tobramycin	21	11	0	10	Fosfomycin	1	0	0	1
Ampicillin + Sulbactam	21	11	0	10	Cefotaxime + Sulbactam	4	2	0	2
Amoxicillin + Clavulanic Acid	20	17	0	3	Cefoperazone + Sulbactam	21	8	0	13
Piperacillin + Tazobactum	21	12	0	9	Ceftriaxone + Sulbactam	19	8	0	11
Ticarcillin + Clavulanic Acid	4	2	0	2	Ceftriaxone + Tazobactum	2	1	0	1

Table 8: Antibiotic Sensitivity pattern of *Morexella catarrhalis*.

Names of Antibiotics	No. of Isolates	R	I	S	Names of Antibiotics	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	1	1	0	0	Netilmicin	1	0	0	1
Amoxycillin	1	1	0	0	Azithromycin	1	1	0	0
Penicillin G	1	1	0	0	Erythromycin	1	1	0	0
Cloxacillin	1	1	0	0	Tigecycline	1	0	0	1
Piperacillin	1	1	0	0	Minocycline	1	1	0	0
Cephalexin	1	1	0	0	Doxycycline	1	1	0	0
Cefuroxime	1	0	0	1	Ciprofloxacin	1	0	1	0
Cefazolin	1	1	0	0	Ofloxacin	1	0	1	0
Cefpodomie	1	0	0	1	Levofloxacin	1	0	0	1
Cefprozil	1	0	0	1	Moxyfloxacin	1	0	0	1
Cefotaxime	1	0	0	1	Gemifloxacin	1	0	0	1
Ceftriaxone	1	0	0	1	Sparfloxacin	1	0	1	0
Ceftrizoxime	1	0	0	1	Pazufloxacin	1	0	0	1
Ceftazidime	1	1	0	0	Norfloxacin	1	1	0	0
Cefixime	1	0	0	1	Colistin	1	1	0	0
Cefoperazone	1	0	0	1	Polymyxin B	1	1	0	0
Cefpirome	1	0	0	1	Clindamycin	1	1	0	0
Cefepime	1	0	0	1	Linezolid	1	1	0	0
Imipenem	1	0	0	1	Lincomycin	1	1	0	0
Meropenem	1	0	0	1	Vancomycin	1	1	0	0
Ertapenem	1	0	0	1	Teicoplanin	1	1	0	0
Doripenem	1	0	0	1	Chloramphenicol	1	0	0	1
Amikacin	1	0	0	1	Cotrimoxazole	1	1	0	0
Gentamicin	1	1	0	0	Mupirocin	1	1	0	0
Ampicillin + Sulbactam	1	0	0	1	Ceftriaxone+ Sulbactam	1	0	0	1
Amoxicillin + Clavulanic Acid	1	0	0	1	Cefepime+ Tazobactum	1	0	0	1
Piperacillin + Tazobactum	1	0	0	1	Ticarcillin+ Clavulanic Acid	1	0	0	1
Cefotaxime + Sulbactam	1	0	0	1	Ceftazidine+ Tazobactum	1	0	0	1
Cefoperazone+ Sulbactam	1	0	0	1	Ceftriaxone+ Tazobactum	1	0	0	1

Table 9: Antibiotic Sensitivity pattern of *Proteus mirabilis*.

Name of Drugs	No. of Isolates	R	I	S	Name of Drugs	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	1	0	0	1	Amikacin	1	0	0	1
Amoxycillin	1	0	0	1	Gentamicin	1	0	0	1
Piperacillin	1	0	0	1	Netilmicin	1	0	0	1
Cephalexin	1	0	0	1	Tobramycin	1	0	0	1
Cefadroxil	1	0	0	1	Tetracycline	1	1	0	0
Cefuroxime	1	0	0	1	Minocycline	1	1	0	0
Cefotaxime	1	0	0	1	Doxycycline	1	1	0	0
Ceftriaxone	1	0	0	1	Ciprofloxacin	1	0	1	0
Ceftrizoxime	1	0	0	1	Ofloxacin	1	0	1	0
Ceftazidime	1	0	0	1	Levofloxacin	1	0	1	0
Cefixime	1	0	0	1	Sparfloxacin	1	0	1	0
Cefoperazone	1	0	0	1	Moxyfloxacin	1	0	1	0
Cefepime	1	0	0	1	Co-trimoxazole	1	0	0	1
Imipenem	1	0	0	1	Nitrofurantoin	1	1	0	0
Meropenem	1	0	0	1	Colistin	1	1	0	0
Ertapenem	1	0	0	1	Polymyxin B	1	1	0	0
Ampicillin + Sulbactam	1	0	0	1	Aztreonem	1	0	0	1
Amoxicillin + Clavulanic Acid	1	0	0	1	Cefoperazone + Sulbactam	1	0	0	1
Piperacillin + Tazobactum	1	0	0	1	Ceftriaxone + Sulbactam	1	0	0	1
Ticarcillin+ Clavulanic Acid	1	0	0	1	Cefepime + Tazobactum	1	0	0	1
Cefotaxime + Sulbactam	1	0	0	1	Ceftazidine + Tazobactum	1	0	0	1

Table 10: Antibiotic Sensitivity pattern of *Pseudomonas aeruginosa.*

Name of Drugs	No. of Isolates	R	I	S	Name of Drugs	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	18	17	0	1	Minocycline	18	18	0	0
Amoxycillin	17	17	0	0	Doxycycline	2	2	0	0
Cloxacillin	1	1	0	0	Ciprofloxacin	19	13	0	6
Piperacillin	19	7	0	12	Norfloxacin	17	13	0	4
Ticarcillin	3	0	0	3	Pefloxacin	16	12	0	4
Azlocillin	1	0	0	1	Ofloxacin	19	13	0	6
Cephalexin	18	17	0	1	Lomefloxacin	18	12	0	6
Cefaclor	17	11	0	6	Levofloxacin	18	13	0	5
Cefuroxime	18	17	0	1	Sparfloxacin	17	13	0	4
Cefazolin	18	2	0	16	Moxyfloxacin	18	12	0	6
Cefotaxime	18	17	0	1	Gemifloxacin	17	11	0	6
Ceftriaxone	18	16	0	2	Pazufloxacin	1	0	0	1
Ceftrizoxime	17	15	0	2	Gatifloxacin	16	11	0	5
Ceftazidime	19	12	0	7	Nalidixic Acid	1	1	0	0
Cefixime	18	18	0	0	Trimethoprim	1	1	0	0
Cefoperazone	19	11	0	8	Sulfonamide	17	17	0	0
Cefpirome	17	12	0	5	Co-trimoxazole	2	2	0	0
Cefepime	19	14	0	5	Vancomycin	18	17	0	1
Cefoxitin	2	2	0	0	Chloramphenicol	18	17	0	1
Imipenem	19	3	0	16	Nitrofurantoin	18	2	0	16
Meropenem	19	6	0	13	Colistin	18	1	0	17
Ertapenem	2	2	0	0	Polymyxin B	2	0	0	2
Amikacin	19	11	0	8	Clindamycin	2	2	0	0
Gentamicin	19	11	0	8	Linezolid	17	1	0	16
Netilmicin	19	9	0	10	Tigecycline	18	18	0	0
Tobramycin	19	13	0	6	Rifampicin	1	1	0	0
Kanamycin	17	16	0	1	Lincomycin	1	1	0	0
Azithromycin	2	2	0	0	Teicoplanin	2	2	0	0
Erythromycin	2	2	0	0	Aztreonem	17	13	0	4
Ampicillin + Sulbactam	18	16	0	2	Cefoperazone + Sulbactam	19	10	0	9
Amoxicillin + Clavulanic Acid	18	18	0	0	Ceftriaxone + Sulbactam	17	12	0	5
Piperacillin + Tazobactum	19	7	0	12	Cefotaxime + Sulbactam	2	2	0	0
Ticarcillin + Clavulanic Acid	3	0	0	3	Ceftriaxone + Tazobactum	1	1	0	0

Table 11: Antibiotic Sensitivity pattern of *Staphylococcus Aureua*.

Names of Antibiotics	No. of Isolates	R	I	S	Names of Antibiotics	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	1	1	0	0	Gentamicin	1	0	0	1
Amoxycillin	1	1	0	0	Tobramycin	1	0	0	1
Piperacillin	1	1	0	0	Netilmicin	1	0	0	1
Ticarcillin	1	1	0	0	Azithromycin	1	0	1	0
Oxacillin	1	0	0	1	Erythromycin	1	0	1	0
Cefuroxime	1	0	0	1	Clarithromycin	1	0	1	0
Cefazolin	1	1	0	0	Tetracycline	1	0	0	1
Cefotaxime	1	0	0	1	Minocycline	1	0	0	1
Ceftriaxone	1	0	0	1	Doxycycline	1	0	0	1
Cefpodoxime	1	0	0	1	Ciprofloxacin	1	0	1	0
Ceftazidime	1	0	0	1	Ofloxacin	1	0	1	0
Cefixime	1	0	0	1	Levofloxacin	1	0	0	1
Cefoperazone	1	0	0	1	Moxyfloxacin	1	0	0	1
Cefepime	1	0	0	1	Lomefloxain	1	1	0	0
Cefoxitin	1	0	0	1	Norfloxacin	1	1	0	0
Cephalothin	1	0	0	1	Colistin	1	1	0	0
Ampicillin + Sulbactam	1	0	0	1	Polymyxin B	1	1	0	0
Amoxicillin + Clavulanic Acid	1	0	0	1	Clindamycin	1	0	0	1
Piperacillin + Tazobactum	1	0	0	1	Linezolid	1	0	0	1
Cefotaxime + Sulbactam	1	0	0	1	Trimethoprim	1	1	0	0
Cefoperazone+ Sulbactam	1	0	0	1	Sulphamethoxazole	1	1	0	0
Cefepime + Tazobactum	1	0	0	1	Vancomycin	1	0	0	1
Imipenem	1	0	0	1	Teicoplanin	1	0	0	1
Meropenem	1	0	0	1	Chloramphenicol	1	0	0	1
Ertapenem	1	0	0	1	Cotrimoxazole	1	0	0	1
Doripenem	1	0	0	1	Nitrofurantoin	1	1	0	0
Amikacin	1	0	0	1	Aztreonem	1	1	0	0

Table 12: Antibiotic Sensitivity pattern of *Shigella dysenteriae*.

Name of Antibiotics	No. of Isolates	R	I	S	Name of Antibiotics	No. of Isolates	R	I	S
		No.	No.	No.			No.	No.	No.
Ampicillin	1	1	0	0	Imipenem	1	0	0	1
Amoxycillin	1	1	0	0	Meropenem	1	0	0	1
Penicillin G	1	1	0	0	Ertapenem	1	0	0	1
Cloxacillin	1	1	0	0	Doripenem	1	0	1	0
Piperacillin	1	1	0	0	Amikacin	1	0	0	1
Cephalexin	1	1	0	0	Gentamicin	1	1	0	0
Cefadroxil	1	1	0	0	Netilmicin	1	0	0	1
Cefaclor	1	1	0	0	Azithromycin	1	0	1	0
Cefazolin	1	1	0	0	Clarithromycin	1	1	0	0
Cefpodomie	1	1	0	0	Tigecycline	1	0	0	1
Cefprozil	1	1	0	0	Tetracycline	1	1	0	0
Cefotaxime	1	1	0	0	Minocycline	1	1	0	0
Ceftriaxone	1	1	0	0	Doxycycline	1	1	0	0
Ceftrizoxime	1	1	0	0	Ciprofloxacin	1	1	0	0
Ceftazidime	1	1	0	0	Ofloxacin	1	1	0	0
Cefixime	1	1	0	0	Levofloxacin	1	1	0	0
Cefoperazone	1	1	0	0	Moxyfloxacin	1	1	0	0
Cefpirome	1	1	0	0	Gemifloxacin	1	1	0	0
Cefdinir	1	1	0	0	Purlifloxacin	1	1	0	0
Cefoxitin	1	1	0	0	Colistin	1	0	0	1
Ampicillin + Sulbactam	1	1	0	0	Polymyxin B	1	0	0	1
Amoxicillin + Clavulanic Acid	1	1	0	0	Clindamycin	1	1	0	0
Piperacillin + Tazobactum	1	0	0	1	Linezolid	1	1	0	0
Cefotaxime + Sulbactam	1	0	0	1	Vancomycin	1	1	0	0
Cefoperazone + Sulbactam	1	0	0	1	Teicoplanin	1	1	0	0
Ceftriaxone + Sulbactam	1	0	0	1	Cotrimoxazole	1	0	0	1
Cefepime + Tazobactum	1	0	0	1					

CONCLUSION

Antibiogram - periodic summary of antimicrobial susceptibilities of local bacterial isolates should be prepared to assess local susceptibility rates, as an aid in selecting empiric antibiotic therapy, minimizing the emergence of resistant strains and in monitoring resistance trends over time within a geographical area.

The practice for performing the sensitivity test before prescribing should be implemented which may reduce the expenses, the risk of resistance and speed patient's recovery.

Hospital Infection Control Committee must be formed for selection of proper antibiotic molecule based on detected bacteria and promote rational use of antibiotics.

ACKNOWLEDGEMENT

This project is financially supported by K.B. Institute of Pharmaceutical Education & Research, Gandhinagar. We owe thanks and take opportunity to extend our sincere gratitude to various pathology laboratories for their immense support.

CONFLICT OF INTEREST

The authors declare no competing interest.

ABBREVIATIONS

MS: Microsoft; **MRSA:** Methicillin Resistant *Staphylococcus aureus*; **SPSS:** Statistical Package for Social Sciences; **WHO:** World Health Organization.

SUMMARY

It was found that most of the bacterial isolates were resistant to cephalosporin class of drugs which is used as an empirical therapy for treating various infections. This resistant pattern against cephalosporin class is due to the irrational use of antibiotics. The practice of performing culture sensitivity test before prescribing antibiotic therapy needs to be adopted.

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