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Assessment of Antimicrobial Resistance Patterns and Beta Lactamase Production Among Clinical Bacterial Isolates in

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الملخص

لا تزال العدوى البكتيرية واحدة من الأسباب الرئيسية للوفاة على مستوى العالم، حيث تصل معدلات الوفيات الناتجة عن العدوى الشديدة إلى حوالي .30%وعلى الرغم من أن العلاج بالمضادات الحيوية قد أثبت فعاليته في تحسين معدلات النجاة، فإن بعض الكائنات الحية الدقيقة سالبة الغرام تمثل تحديات كبيرة، لا سيما في حالات العدوى المكتسبة من المجتمع. جمع وعزل وتشخيص البكتيريا الممرضة من العينات والمسحات السريرية المختلفة تم جمع ما مجموعه 100عينة سريرية من المرضى المترددين على مستشفى محمد المقريف وعدد من مرافق الرعاية الصحية الخاصة في مدينة أجدابيا، ليبيا .وشملت العينات التي تم جمعها عينات البول، والبلغم، ومسحات الحلق، ومسحات الجروحالصديد .وقد جُمعت جميع العينات بهدف عزل البكتيريا والخمائر الممرضة وزراعتها وتشخيصها باستخدام الطرق والإجراءات الميكروبيولوجية القياسية. في هذه الدراسة، تم جمع 100 عينة سريرية، وكانت موزعة على النحو التالي: عينات البول 50 :عينة .(50.0%) مسحات الجروح الصديد 25عينة .(25.0%) عينات البلغم 15 :عينة .(15.0%) مسحات الحلق 10 :عينات .(10.0%)

ومن إجمالي العينات، أظهرت 72عينة وجود عدوى ميكروبية، وتوزعت على النحو التالي:

أظهرت نتائج الدراسة اخرى الحصول على 84عزلة ميكروبية .ومن بينها، كانت هناك 73عزلة من العصيات سالبة الغرام (Gram-negative bacilli)، بنسبة 86.9%، وهي الأكثر شيوعاً مقارنة بالمكورات موجبة الغرام (Gram-positive cocci)، التي بلغ عددها 9عزلات بنسبة .10.7% ومن خلال تحليل نتائج الزراعة واختبارات الحساسية للمضادات الحيوية للأنواع البكتيرية المختلفة التي تم عزلها من العينات السريرية المتنوعة في مختبرات الأحياء الدقيقة المختلفة، تبين وجود مستويات مرتفعة من البكتيريا المقاومة للمضادات الحيوية، خاصة في عينات البول للحد من انتشار العدوى البكتيرية وتقليل انتقال الكائنات الدقيقة المقاومة للمضادات الحيوية، يُوصى باتباع إجراءات مكافحة العدوى، ومن أهمها: المحافظة على النظافة الشخصية الجيدة. غسل اليدين قبل وبعد التعامل مع المرضى. الاستخدام المناسب لمطهرات اليدين المعتمدة على الكحول. استخدام معدات الوقاية الشخصية، مثل القفازات، والعباءات الواقية، والكمامات، والنظارات الواقية

ABSTRAT

Bacterial infections remain one of the leading causes of death globally, with mortality rates from severe infections reaching approximately 30%xr. While antibiotic treatment has been shown to improve survival rates, certain Gram-negative microorganisms present significant challenges, particularly in cases of community-acquired infections. Collection, isolation and identification of pathogenic bacteria from different clinical samples and specimens **,** A total of 100 clinical specimens were collected from patients attending Elmergib Hospital and several private healthcare facilities in Ajdabiya City, Libya. The collected specimens comprised urine, sputum, and throat swab samples. All specimens were obtained for the subsequent isolation, cultivation, and identification of pathogenic bacteria and yeasts using standard microbiological procedures. In this study 100 clinical samples and specimens were collected. Urine samples 50.0% Wound (pus) swabs 25 25.0% Sputum samples 15.0% Throat swabs 10.0% .Out of them, 72 samples and specimens were positive for microbial infection. They include, 37 urine samples (51.4%), 20 wound (pus) swabs (27.8%), respiratory tract infection (19.4%) as 8 sputum samples (11.1%), and 6 throat swabs (8.3%) and only one stool specimen (1.4%). Our results revealed that, 84 microbial isolates were obtained. Out of them, seventy three isolates of Gram negative bacilli (86.9%) which were much more common than Gram positive cocci (9 isolates) 10.7%. Our analysis of the culture and sensitivity test results of the various species of bacteria isolated from different clinical specimens at various microbiology laboratories revealed that high levels of resistant bacteria were recovered from urine specimens. Good personal hygiene, such as hand washing before and after patient contact and the appropriate use

of alcohol based hand rub solutions The use of barrier equipment such as gloves, gowns, masks and goggles.

1.INTRODUCTION

Bacterial infections remain one of the leading causes of death globally, with mortality rates from severe infections reaching approximately 30%xr. While antibiotic treatment has been shown to improve survival rates, certain Gram-negative microorganisms present significant challenges, particularly in cases of community-acquired infections. Key pathogens in this group include Pseudomonas aeruginosa, Acinetobacter spp., and Enterobacteriaceae family. Over time, bacterial pathogens have developed increased resistance to commonly used antibiotics, making antimicrobial resistance a critical medical and public health concern. Such resistance often leads to treatment failure, posing serious risks, especially for critically ill patients. Among Gram-negative bacilli, antibiotic resistance is especially pronounced, with some strains exhibiting high levels of resistance to aminoglycosides, beta-lactams, and quinolones. The extensive use of broad-spectrum antibiotics has contributed to the rise of antibiotic-resistant strains in many Gram-negative organisms. This resistance has developed in Gram-negative bacilli due to both their innate resistance in some species and their remarkable ability to acquire antibiotic-resistant traits from one another. Certain Gram-negative microorganisms, such as Pseudomonas aeruginosa, Acinetobacter species, and the Enterobacteriaceae family, pose especially significant challenges. As a result, newer generations of antibiotics will continue to face persistent and growing challenges from these resilient pathogens. Beta-lactamases serve as the primary defense mechanism for Gram-negative bacteria against broad-spectrum beta lactam antibiotics. These antibiotics, which include penicillins, cephalosporins, and monobactams, rank among the most commonly prescribed treatments globally. To date, over 400 distinct types of beta-lactamases have been identified from clinical isolates. Resistance to these newer beta lactam antibiotics due to the action of beta-lactamases developed rapidly. This study aims to isolate and identify bacteria contributing to antibiotic resistance . [(1)]

1.1 Microbial infection

Bacterial infections continue to represent a major challenge to healthcare systems worldwide due to their diverse origins and increasing complexity. A considerable number of these infections are endogenous, arising from microorganisms that normally inhabit different parts of the human body. Although the normal bacterial microbiota plays an essential role in maintaining human health and physiological balance, certain bacterial species may become opportunistic pathogens under specific conditions, potentially leading to various infectious diseases .

Antibiotic therapy remains one of the fundamental approaches used in the management of bacterial infections. One of the most serious challenges facing modern medicine is the emergence and continuous spread of antimicrobial resistance, which reduces the effectiveness of commonly used antibiotics and complicates the treatment of infectious diseases. Of particular concern is the increasing occurrence of bacterial isolates capable of producing antibiotic-inactivating enzymes, especially extended-spectrum beta-lactamases (ESBLs), AmpC beta-lactamases, and carbapenemases, including metallo-beta-lactamases (MBLs). These resistance mechanisms contribute significantly to the development of multidrug-resistant bacterial strains, limiting available therapeutic options. Consequently, the continued spread of resistant bacterial pathogens raises concerns about the possibility of entering a post-antibiotic era, in which effective treatment options for several bacterial infections may become increasingly limited . [(2,3)]

1.2 Antibiotics are natural compounds produced by microorganisms, which, even at low concentrations, can inhibit the growth or eliminate other microorganisms. These substances have been extracted from various sources, primarily from bacteria, such as tetracyclines, bacitracin, polymyxin, chloramphenicol, and streptomycin, as well as from fungi, including cephalosporins and penicillins. Penicillin, the first antibiotic to be discovered, was identified by Sir Alexander Fleming in 1928. The onset of industrialization marked a game-changing era, leading to the development of numerous additional antibiotics. The worldwide health problem stems from an accelerating rate of bacterial antibiotic resistance, according to researchers . The continuous exposure to antibiotics has resulted in antimicrobial resistance development and

making bacteria resistant to multiple antibiotics. The antibiotic-use practice on livestock leads to dangerous Escherichia coli bacterial isolates that present an infection risk to humans. Human infections alongside foodborne outbreaks have increased because the growing trend of plant-based food consumption leads to pathogenic and opportunistic bacteria found in fruits and vegetables . The increasing number of MDROs presents significant risks for patients by creating public health challenges during surveillance monitoring. The absence of new antibiotics makes infection treatment more difficult as resistance numbers keep increasing worldwide. [4,5]

1.3 The Basic Characteristics of Antibiotics

Antibiotics serve multiple purposes, including treating and preventing infections as well as promoting growth in animals. They originate from three primary sources: molds or fungi, bacteria, and synthetic or semi-synthetic compounds. These medications can be administered internally or applied topically, functioning either by inhibiting the growth of pathogens or by killing them outright. Based on their mode of action, antibiotics are categorized into two types: bacteriostatic drugs, which slow down the growth of pathogens, and bactericidal drugs, which eliminate bacteria. That said, this classification isn't entirely rigid, as their effects can vary depending on factors such as drug concentration, bacterial species, and the stage of bacterial growth. Antibiotics tend to be most effective against bacteria that are actively growing, rather than non-growing persisters or dormant spores. When two antibiotics are used together, their combined effects can vary ranging from additive (where the effects simply sum up), synergistic (where they enhance each other's efficacy), or antagonistic (where one reduces the effectiveness of the other). Antibiotics are also categorized into broad-spectrum and narrow-spectrum types. For instance, tetracycline, a broad-spectrum antibiotic, is effective against Gram-positive (G+), Gram-negative (G-) bacteria, and even mycobacteria. [6]

1.4 Bacterial antimicrobial resistance (AMR)

Antimicrobial resistance (AMR) is defined as the ability of microorganisms, including bacteria, fungi ,viruses, and parasites, to develop mechanisms that enable them to withstand the action of antimicrobial agents that were previously effective in controlling or eliminating them . Consequently, infections caused by resistant microorganisms may become more difficult to manage, as conventional therapeutic approaches lose their effectiveness, allowing infections to persist and potentially spread within populations . AMR encompasses several forms of resistance, including bacterial resistance to antibiotics, as well as resistance to antiviral, antifungal, and antimalarial medications .This growing public health challenge contributes significantly to increased disease severity, mortality rates, and substantial socioeconomic consequences worldwide . The development of antibiotics and the subsequent emergence of resistance represent two closely interconnected stages in the history of modern medicine.

The mid twentieth century, commonly recognized as the Golden Age of antibiotic discovery, witnessed the introduction of several important antimicrobial drug classes. These included sulfonamides, β-lactam antibiotics such as penicillin and its derivatives, aminoglycosides, tetracyclines, macrolides, and glycopeptides, which revolutionized the prevention and treatment of bacterial infections . However, the widespread and extensive use of these therapeutic agents was accompanied by the progressive emergence of antimicrobial resistance. These mechanisms include spontaneous genetic mutations, horizontal gene transfer (HGT), the activation of efflux pump systems, enzymatic degradation or modification of antimicrobial agents, and alterations in drug-target sites, among other molecular and biochemical processes. [7]

1.5 Major antibiotic families and their mechanisms of action Antibiotic families

Antimicrobial agents are classified as either bacteriostatic or bactericidal. Bacteriostatic agents work by inhibiting bacterial growth or reproduction, allowing the host's immune system the opportunity to eliminate the bacteria. In such cases, successful removal of the bacteria relies on the effectiveness of the immune system. Bactericidal agents, on the other hand, directly kill bacteria, ensuring their elimination regardless of the immune system's competence. Inhibition of cell wall synthesis is achieved through agents such as penicillins, cephalosporins, daptomycin, and glycopeptides. For protein synthesis, tetracyclines, aminoglycosides,

oxazolidinones, streptogramins, ketolides, macrolides, and lincosamides are utilized. DNA synthesis can be inhibited by fluoroquinolones. Competitive inhibition of folic acid synthesis involves sulfonamides and trimethoprim. RNA synthesis can be inhibited using rifampin, while metronidazole falls into the category of miscellaneous agents. [8]

1.6 Biochemical Mechanisms Underlying Antimicrobial Resistance

Enzymatic Inactivation of Antimicrobial Agents

One of the major biochemical mechanisms contributing to antimicrobial resistance is the production of microbial enzymes that facilitate the degradation or structural modification of antimicrobial compounds. Among bacteria, β-lactamases, including extended-spectrum β-lactamases (ESBLs) and carbapenemases, represent prominent examples, alongside enzymes responsible for aminoglycoside modification. The production of these enzymes interferes with the chemical structure or functional activity of antimicrobial agents, consequently compromising their therapeutic efficacy before they can interact with their specific cellular targets. [9]

1.7 Overexpression of Efflux Transport Systems

The activation and overexpression of efflux transport systems constitute another important mechanism through which microorganisms develop reduced susceptibility to antimicrobial agents. These membrane-associated transport proteins actively remove antimicrobial compounds from the intracellular environment, resulting in subtherapeutic intracellular drug concentrations. In Gram-negative bacteria, resistance-nodulation-division (RND) transporters are particularly significant, whereas fungal species employ several efflux transporter systems, including Candida drug resistance (CDR) proteins and multidrug resistance protein 1 (MDR1). Increased expression of these transporters has been implicated in the development of resistance to multiple antimicrobial agents. Accordingly, the identification and development of efflux pump inhibitors have attracted considerable research interest as potential strategies for restoring antimicrobial susceptibility . [10]

1.8 Impaired Membrane Permeability and Antimicrobial Target Alterations

Microorganisms may also acquire antimicrobial resistance through modifications that affect cellular permeability or alter the molecular structures targeted by antimicrobial compounds. In bacteria, structural changes in the cell envelope, particularly alterations in membrane porins, can restrict the penetration and intracellular accumulation of antibiotics. Furthermore, mutations or structural modifications involving antimicrobial target sites, such as penicillin-binding proteins and ribosomal RNA, may interfere with drug–target interactions and reduce antimicrobial binding affinity.

Similarly, in pathogenic fungi, genetic alterations affecting specific resistance-associated pathways contribute to reduced susceptibility to antifungal medications. [11]

1.9 Biofilm-Associated Antimicrobial Resistance and Tolerance

Biofilm formation represents a complex microbial survival strategy that significantly contributes to reduced susceptibility to antimicrobial treatments. Biofilms are characterized by structured microbial communities embedded within an extracellular polymeric substance (EPS) matrix, which provides a protective environment and may impede the diffusion of antimicrobial compounds. In addition to this physical barrier, microorganisms within biofilms frequently exhibit physiological adaptations, including decreased metabolic activity, altered growth rates, and the development of persistent subpopulations (persister cells). These characteristics collectively enhance microbial survival during antimicrobial exposure.

Moreover, efflux pump activity and quorum-sensing regulatory pathways may further facilitate biofilm development, maturation, and persistence. Consequently, biofilm-associated microorganisms generally demonstrate greater antimicrobial tolerance than their corresponding planktonic forms, making infections involving biofilms particularly challenging to eradicate . [12]

Figure2.1 Antibiotic resistance in microbes

2.MATERIALS AND METHODS

This study was a Elmegriaf hospital in Ajdabyia city based cross sectional study done for a period of six months from March 2026 to August 2026.

2 .1 Collection of Samples and Specimens

2.1.1 Urine Samples

Urine Samples were collected from infected patients for culture investigations. The colonies were identified and antimicrobial sensitivity were performed**.** Morning urine samples were collected in sterile containers to maximize microbial concentration, utilizing the bacterial accumulation during overnight bladder storage. Patients were given clear instructions on the correct collection methods to reduce contamination risks. Once collected, the specimens underwent aerobic incubation at 37°C for 24 to 72 hours to promote bacterial growth. Given urine's suitability as a medium for microbial proliferation, the samples were promptly analyzed and cultured using three types of media, including Cystine Lactose Electrolyte Deficient (C.L.E.D.) agar and MacConkey agar.**m**. This study also showed that methicillin resistant *S. aureus* (MRSA) represented (5.7%) from all bacterial isolates tested .

2.1.2 Pus Swabs

Specimens were collected from infected skin from different sites .The specimens were taken by sterile gloves and sterile swab that is to see they were performed under sterile conditions to obligate the incidence of contamination , there after cultured for bacterial growth and for antibiotic sensitivity . Pus swabs collected from affected skin areas under aseptic condition were cultured & tested for antibiotic sensitivity . Many types of bacterial growth media are used to culture bacteria in the laboratory . Bacteria grown in a laboratory environment , like captive animals in a zoo , need to have everything provided for them food , water , a suitable environment in order to survive and thrive . The most common isolates bacteria from the culture growth was Staphylococcus aureus

2.2 Media Used for Isolation and Cultivation of Pathogenic Bacteria

Pathogenic bacteria were isolated using culture plates prepared with the following media:

2.2.1 Nutrient Agar This is a general-purpose medium designed for the cultivation of microorganisms.

2.2.2 Blood Agar Blood agar consists of nutrient agar (900 ml) combined with sterile whole blood (100 ml). To prepare this medium, the sterile nutrient agar is melted and cooled to a temperature of 45-47ºC. Animal (horse or sheep) or human blood is then added aseptically to preserve its sterility.

2.2.3 Chocolate Agar (Enriched Medium) This is a modified version of blood agar in which red blood cells are lysed by gradually heating the medium to 80ºC. It is particularly used for growing fastidious organisms.

2.2.4 Cystine Lactose Electrolyte Deficient (C.L.E.D.) Agar This medium is recommended for diagnostic urinary bacteriology. It supports the growth of all urinary pathogens while providing good colonial differentiation and clear diagnostic features.

2.2.5 MacConkey Agar

A selective medium primarily used for detecting and enumerating coliform organisms such as Escherichia coli. It is also effective in isolating Salmonella and Shigella species, especially from stool samples.

2.3 Examination of the Specimen Microscopically

2.3.1 Gram Staining

The Gram staining technique is employed to identify bacteria based on their Gram reaction (Gram-positive or Gram-negative) and morphology. This method involves the following reagents: -

Crystal violet stain

Lugol's iodine solution

Acetone alcohol as a decolorizing agent

Neutral red solution at 0.1% w/v concentration This process aids in differentiating bacterial species, making it an essential step in diagnostic microbiology.

2.4.1 Antimicrobial Agents Utilized:

All isolated pathogenic bacteria obtained from various samples and specimens underwent sensitivity testing against 20 different antimicrobial agents. These agents were specifically employed for pathogenic Gram-negative bacilli.

In contrast, rifampicin (RD) was exclusively used to assess susceptibility in pathogenic Gram-positive cocci.

2.4.2 Disc Diffusion Susceptibility Approach:

The disc diffusion technique remains the standard method utilized by most laboratories for routine antimicrobial susceptibility testing. A blotting paper disc, impregnated with a measured volume and optimal concentration of an antimicrobial agent, is placed onto an agar plate uniformly inoculated with the test microorganism. This creates a controlled environment to observe the organism's response to the antimicrobial agent and assess its susceptibility.

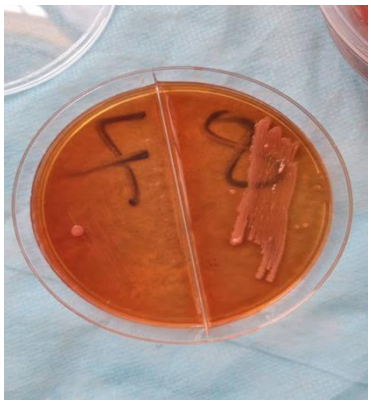


Figure 2.1 Klebsiella bacteria



Figure 2.2 Pseudomonas



Figure 2.3 E. Coli



Figure 2.4 Staph aureus





Figure 2.5 Antibiotic Susceptibility Discs





Figure 2.6 Results of Antibiotic Susceptibility test of bacteria staph aureus



Figure 2.7 Results of Antibiotic E.coli

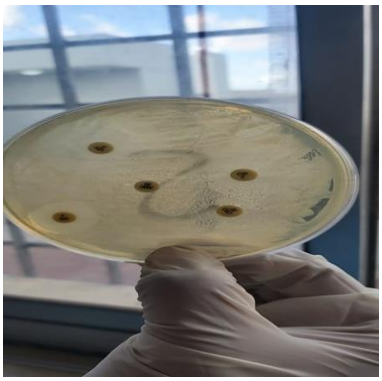


Figure 2.8 Results of Antibiotic Klebsella

3.RESUTES

A total of 100 clinical specimens were collected from patients attending Elmergib Hospital and several private healthcare facilities in Ajdabiya City, Libya. The collected specimens comprised urine, sputum, and throat swab samples. All specimens were obtained for the subsequent isolation, cultivation, and identification of pathogenic bacteria and yeasts using standard microbiological procedures.

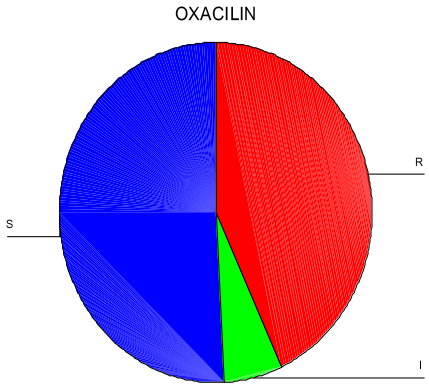


Figure 3.1 Staphylococcus aureus show more resistant to these antibiotics

Table 3.1. Distribution of Bacterial Culture Results Among Different Clinical Specimens

Source of clinical specimens	Total cases (n)	Positive, n (%)	Negative, n (%)
Urine samples	50	35 (70.0%)	15 (30.0%)
Wound (pus) swabs	25	20 (80.0%)	5 (20.0%)
Sputum samples	15	10 (66.7%)	5 (33.3%)
Throat swabs	10	10 (100.0%)	0 (0.0%)
Total	100	75 (75.0%)	25 (25.0%)

Table:3.2 Distribution of Bacterial Isolates According to Type of Clinical Specimen

Type of Sample or Specimen	Total No. of Isolates	Frequency (%)	Gram-Negative Bacilli (n)	Frequency (%)	Gram-Positive Cocci (n)	Frequency (%)
Urine samples	50	50.0%	35	70.0%	15	30.0%
Wound (pus) swabs	25	25.0%	22	88.0%	3	12.0%
Sputum samples	15	15.0%	13	86.7%	2	13.3%
Throat swabs	10	10.0%	6	60.0%	4	40.0%
Total	100	100.0%	76	76.0%	24	24.0%

Table 3.3 Prevalence of Gram- positive isolates according to susceptibility to antimicrobials agents

Antimicrobial	Susceptible	Intermediate	Resistant
Gentamycin- syn	69.2%	4.2%	26.6%
Gentamycin	18.9%		81.1%
Imepinim	25.2%		74.8%
Cifoxitin	17.5%		82.5%

Cefotaxim	3.5%	2.1%	94.4%
Ampicillin	0.7%		99.3%
Penicillin	6.3%		93.7%
Oxacillin	20.3%		79.7%
Augmentin	35.0%		65.0%
Daptomycin	65.0%		35.0%
Trimethoprim-Sulfamethoxazole	86.0%	2.1%	11.9%
Teicoplanin	91.6%	3.5%	4.9%
Vancomycin	87.4%	2.1%	10.5%
Clindamycin	47.6%	4.2%	10.5%
Erythromycin	45.5%	2.1%	52.4%
Linezolid	84.6%	3.5%	11.9%
Ciprofloxacin	90.2%	2.8%	7.0%
Rifampin	95.8%	0.7%	3.5%
Tetracyclin	59.4%	0.7%	39.9%

Table 3. 4 s Prevalence of Gram- negative isolates according to susceptibility to antimicrobials agents

Antimicrobial	Susceptible	Intermediate	Resistant
Amikacin	77.9%		22.1%
Gentamycin	36.8%	0.9%	62.8%
Imepinim	92.0%	3.5%	4.4%
Meropenim	90.3%		9.7%
Cefalothin	6.2%	4.4%	89.4%
Cefurxime	17.7%	3.5%	78.8%
Cefoxitin	46.9%	6.2%	46.9%
Ceftazidim	37.2%	0.9%	61.9%
Cefotaxim	30.1%	1.8%	68.1%
Cefepime	31.9%	2.7%	65.5%
Aztronam	35.4%	0.9%	63.7%
Ampcillin	8.0%	3.5%	92.0%
Pipreracillin	16.8%	0.9%	82.3%
Augmentin	15.0%	11.5%	73.5%

Piperacillin-Tazobactam	47.8%	8.8%	43.4%
Colistin	43.4%	1.8%	54.9%
Trimethoprim-Sulfamethooxazole	49.6%		50.4%
Ciprofloxacin	44.2%	2.7%	53.1%
Tetracyclin	35.4%	3.5%	61.1%

Table 3.5 :Distribution of bacterial isolates according to production of resistance enzymes

Extended-spectrum-ß-lactamases (ESBLs)

Type of pathogen	Non MNo: (%)	ESBL No: (%)	BLCT- No: (%)	MRS No: (%)	Total No: (%)
E. coli	11 7.0%	9 5.7%			20 12.7%
K. pneumoniae	10 6.4%	15 9.6%			25 15.9%
K. oxytoca		1 0.6%			1 0.6%
S. aurues	3 1.9%		5 3.2%	9 5.7%	17 10.8%
S. epidermidis	1 0.6%		1 0.6%	13 8.3%	15 9.6%
S. haemolyticus				4 2.5%	4 2.5%
S. hominis	2 1.3%		3 1.9%	13 8.3%	18 11.5%
S. warneri	3 1.9%			2 1.3%	5 3.2%
S. saprophyticus	1 0.6%			5 3.2%	6 3.8%
S. cohnii	1 0.6%				1 0.6%
S. capitis	1 0.6%		2 1.3%	6 3.8%	9 5.7%

BLCT ß-lactamases CTX-M stands for Cefotaximase-Munich, a major family of Extended-Spectrum Beta-Lactamases (ESBLs)

MBL Metallo-beta lactamase

4. Discussion:

Resistance to antibiotics is an extremely serious threat to patient care all over the world. Rapidly rising antibiotic resistance is a challenge to comprehensive patient care in all branches of medical science. The interaction between various clinical bacteria and the antimicrobial agents is a complex issue involving the prokaryotic adaptive mechanisms and genetic changes. Judicious use of antibiotics and frequent surveillance are needed to curb this threat and preserve the antibiotics for the future. Infectious diseases are the result of host invasion with a pathogen. The detection, treatment and prevention of human disease is the challenge which face the physicians; pharmacists and microbiologists. Throughout our life we are in contact either continuously or sporadically with human pathogenic microorganisms which may cause such disturbance in our health. Bengtsson-Palme, J.; Kristiansson Pathogenesis of community acquired infection involves a complex interaction between an organism, the environment and the potential host. the capacity of microorganisms to produce disease is determined by its virulence factors. In this study 100 clinical samples and specimens were collected. Urine samples 50.0% Wound (pus) swabs 25 25.0% Sputum samples 15.0% Throat swabs 10.0% . Another Study y Mohanty H, Pachpute 72 samples and specimens were positive for microbial infection. They include, 37 urine samples (51.4%), 20 wound (pus) swabs (27.8%), respiratory tract infection (19.4%) as 8 sputum samples (11.1%), and 6 throat swabs (8.3%) and only one stool specimen (1.4%). Our results revealed that, 84 microbial isolates were obtained. Out of them, seventy three isolates of Gram negative bacilli (86.9%) which were much more common than Gram positive cocci (9 isolates) 10.7%. Only two yeast isolates (2.4%) were obtained and both of them from urine samples. There were twelve cases showed mixed infections.

Allen HK, Moe LA, Rodbumrer suggested that, the urinary tract infection was the leading site of infections (49%) in a survey of 2.099 Gram negative bacilli from community infections, followed by respiratory tract infection (RTI) 21%, then wound infections (20%), blood (7%), and the other samples represents 3% of the total clinical samples.

6.Conclusion

Our analysis of the culture and sensitivity test results of the various species of bacteria isolated from different clinical specimens at various microbiology laboratories revealed that high levels of resistant bacteria were recovered from urine specimens.

7.RECOMMENDATION

- Good personal hygiene, such as hand washing before and after patient contact and the appropriate use of alcohol based hand rub solutions
- The use of barrier equipment such as gloves, gowns, masks and goggles
- Appropriate handling and disposal of sharps (for example, needles) and clinical waste (waste generated during patient care)
- Aseptic techniques.

Implementing standard precautions minimises the risk of transmission of infection from person to person, even in high risk situations.

Wash hands before and after food handling, going to the toilet and changing nappies.

Cover your nose and mouth when coughing and sneezing.

8.References

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