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ANTIBIOTICS SENSITIVITY PATTERN OF *E. COLI* SPECIES ISOLATED AT TERTIARY CARE HOSPITAL

Vipin Kumar and Vipin Kumar Sharma

Gurukul Kangri University, Haridwar, Haridwar - 249404, Uttarakhand, India.

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Correspondence to Author:
Vipin Kumar

Gurukul Kangri University, Haridwar - 249404, Uttarakhand, India.

E-mail: geetikapant4@gmail.com

ABSTRACT: Worldwide antimicrobial resistance is a serious problem and differs from region to region. This study has designed the determination of the incidence and sensitivity pattern of *Escherichia coli (E. coli)* and discusses the general issues related to antimicrobial resistance. Prospective study was carried out between JAN to April 2020. Samples of urine, blood, pus and miscellaneous (fluids, swabs and sputum) were collected from indoor patients. The present antimicrobial susceptibility of *E. coli*, *the* study was performed in the Department of Microbiology Narayana Super-specialty Gurugram, Total of 315 samples were tested out, 97 samples showed growth on culture and out of 97 samples, 40 *E. coli* have isolated and tested antibiotics sensitivity, it has been demonstrated that different samples showing a significant amount of antimicrobials Sensitivity and resistance to different antibiotics (Table 2). Antimicrobials, namely Meropenem have shown sensitivity (65%), imipenem (60%), Colistin (70%). Thus, there is a need for the implementation of strong antimicrobial stewardship program and stop misuse of antibiotics with an instant effect. Our region's present study helped us see the actuality of the antibiotic sensitivity pattern of bacteria, which is not good. To reduce antibiotic resistance, immediate steps must be taken as new antibiotic development is very quick. Otherwise, it will result in moving us to a pre-antibiotic era which would be a great step back for the human community.

INTRODUCTION: *Escherichia coli* is a gram-negative anaerobic, facultative, rod-shaped coli form bacterium of the genus Escherichia that is mostly found in the lower intestine of endotherm. Generally, *E. coli* are harmless, but few serotype ETEC and EPEC *etc*. causes serious food poisoning of its own hosts. In current year drug resistance to human pathogenic bacteria is commonly reported throughout world.

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Antimicrobial resistance nowadays well known as scientific and public fitness problem [3]. It is an emerging issue, particularly in the health center and newly industrialized countries of Asia and the pacific [4]. Gram-negative microorganism motive infections: pneumonia, bloodstream infections, wound or surgical web page infections, and meningitis in healthcare settings.

Gram-negative microorganisms are resistant to a couple of capsules, and more and more are resistant to the most reachable antibiotics. These microorganisms have built-in Competencies to locate new approaches to be resistant and ignore alongside genetic substances that permit different microorganisms to grow to be drug resistant. Gram-negative infections encompass these prompted by

using *Klebsiella pneumonia (K. pneumoniae), Pseudomonas aeruginosa (P. aeruginosa). Escherichia coli (E. coli) and Acinetobacter are as nicely as many different,* less frequent bacteria. *Pseudomonas aeruginosa* is the most difficult microorganism to deal with resistance to a range of antibiotics. Escherichia coli (*E. coli*), the universal facultative Gram-negative bacillus in the human fecal flora, usually inhabit the colon as an innocuous commensal. Theoretically, the antimicrobial that treats *E. coli* is cotrimoxazole, fluoroquinolones, piperacillin, 0.33 technology cephalosporins, carbapenems and aminoglycosides. Surveillance statistics exhibit that resistance in *E. coli* is persistently absolute best for antimicrobial dealers that have been in use for the longest time in human and veterinary medicine. Enterobacter cloacae have been pronounced as necessary opportunistic and multi-resistant bacterial pathogens for people for the duration of the closing three many years in health facility wards.

E. cloacae and *E. hormaechei* are most often remoted from human medical specimens. *E. cloacae* complicated are no longer understood yet; this should be due to the shortage and the dispersion of records available. Its ability to structure biofilms and secrete a variety of cytotoxins (enterotoxins, hemolysins, pore-forming toxins) is vital for its pathogenicity [11]. Serratiamarcescens, a gram-negative bacillus categorized as a member of the Enterobacteriaceae, has been recognized as a reason of hospital-acquired contamination for the ultimate too many years. *S. marcescens* used to be viewed in the beginning to be an innocuous, non-pathogenic saprophytic water organism and was once often used as an organic marker due to the fact its, without problems, known as pink colonies.

The colonies are 1 to 2mm, non-hemolytic, mcoid, easy and spherical on sheep's blood agar after 24 hours of incubation at 37ºC [15] MRSA is a precise pressure of the *S. aureus* is resistant to methicillin and all β-lactams. Later use of Oxacillin as a choice to methicillin in susceptibility assessments resulted in the time period 'Oxacillin-resistant *S. aureus'* (ORSA), which is resistant to severe antibiotics. Before the improvement of antibiotics, invasive infections prompted with the aid of *Staphylococcus aureus* have frequently been deadly [18]. Candida species are the essential purpose of superficial to systemic fungal contamination in people and the important supply of contamination in fitness care facilities [20]. Albicans is the fundamental pathogenic agent of systemic infections; however, for the duration of the current years, the charge of non-albicans Candida species has accelerated in many reports [21]. *Enterococcus faecalis* and *Enterococcus faecium* Enterococci reason large infections, together with intraabdominal sepsis, urinary tract infections, bacteremias and endocarditis. It has been described considerably with the aid of Hauser already in 1885 and is regarded to purpose a large spectrum of human diseases, in particular in the hospitalized patient. It bills for about 3% of nosocomial infections in the United States and ranks 1/3 as the reason of trouble-free cystitis, pyelonephritis, and prostatitis. [27].

MATERIALS AND METHODS:

Sample Collection: This study was conducted at the Department of Microbiology in tertiary care hospital. From Jan-2020 to April 2020, different types of clinical specimens, Such as blood, urine, pus, swab, etc., were received from the inpatient. Antimicrobial susceptibility pattern *Escherichia coli (E. coli),* from Jan-2020 to June 2020, was analyzed and reported.

Identification of Bacteria: The bacteria were cultured on MacConkey's agar, Nutrient agar, blood agar and other selective media, followed by the recognition of the isolates based on their cultural characteristics, gram staining, motility, and reactions in standard biochemical tests.

FIG. 1: ESCHERICHIA COLI GROWTH ON CLAD AGAR MEDIUM

Antimicrobial agents: By the Kirby-Bauer disk diffusion technique on Muller Hinton Agar by

Filter Paper disks impregnated with antibiotics (Span diagnostics Limited, Surat, India) susceptibility. A pre-diffusion time of 30 min was allowed at room temperature, and the plates were incubated at 37°C for 24 h. The diameter of the zone of inhibition was measured and compared to that of standard strain, and the results were interpreted as sensitive or resistant, based on Clinical Laboratory Standard Institute 2014 guidelines. The percentage antimicrobial susceptibility of the isolated microorganism against different antimicrobials tested was calculated and interpreted as sensitive and resistant

RESULTS AND DISCUSSION: During this study total sample collected was 315; a total 97 organisms were isolated from 315. Out of all samples, the highest percentage was shown in urine (41.23%) followed by 21% in blood. Out of 97 positive samples of *E. coli*, 70 samples (72.16%) were isolated in women. In the present study, colistin shows the highest sensitivity 70%, meropenem has shown the 65%. The antimicrobial agents are losing their growth on culture, and out of 97 samples, 40 *E. coli*, were isolated and tested for antibiotics sensitivity; it has been demonstrated that different samples show a significant amount of antimicrobials Sensitivity and resistance to different antibiotics **Table 2**. Antimicrobials, namely Meropenem have shown sensitivity (65%), imipenem (60 %), Colistin (70%).

TABLE 1: PRESENCE OF *E. COLI* STRAINS IN OUTPATIENT POPULATION WITH POSITIVE URINE CULTURES. X2= 40.0071; P=0

Gender	Men	%	Women	%
Isolated *E. coli* strains	20/97	20.61%	70/97	72.16%

TABLE 2: ISOLATION OF ORGANISM FROM DIFFERENT CLINICAL SAMPLES

Nature of Sample	No of sample (N=97)	Percentage (%)
Blood	21	21.64948454
Urine	40	41.2371134
E/T Secrtion	12	12.37113402
Pus	13	13.40206186
Bal	5	5.154639175
Sputum	2	2.06185567
As cite Fluid	1	1.030927835
Drain Fluid	2	2.06185567
Bile CBD Tip	1	1.030927835
Total	97	100

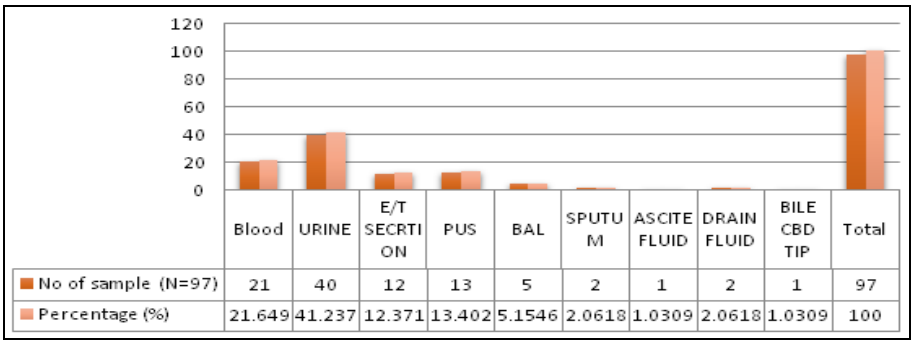

FIG. 2: ISOLATION OF ORGANISMS FROM DIFFERENT CLINICAL SAMPLES

TABLE 3: ANTIBIOTICS SENSITIVITY PATTERN

Antibiotics	Resistance	%	sensitivity	%	Intermediate	%
Meropenem	4	10	26	65	1	2.5
Imipennem	2	5	24	60	2	5
Ertapenem	4	10	22	55		
Gentamycin	4	10	23	57.5		
Amikacin	3	7.5	22	55		
Ciprofloxacin	14	35	13	32.5	3	7.5
Levofloxacin	1	2.5	1	2.5		
Colistin	0	0	28	70		

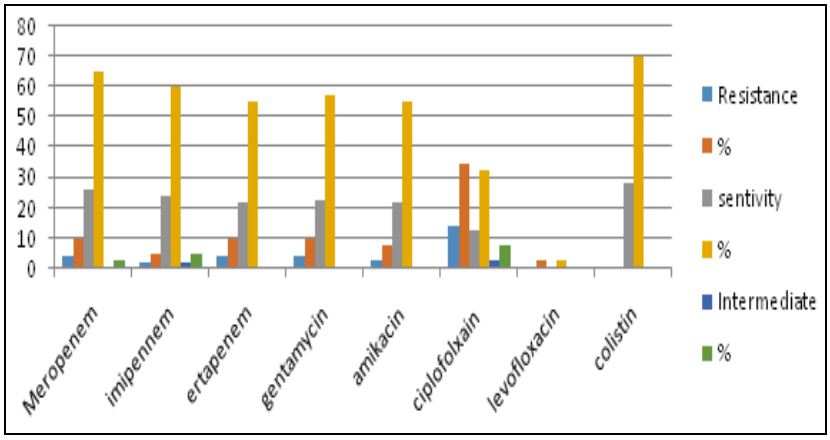

FIG. 3: ANTIBIOTICS SENSITIVITY PATTERN

CONCLUSION: In this study, the clinical isolation of *E. coli* indicates resistance to commonly used antibiotics and towards newer antibiotics. Because of the spread of resistant organisms and indiscriminate use of antibiotics, lack of awareness, patient noncompliance, and unhygienic conditions antimicrobial agents are losing their efficacy.

It is the need of time that antibiotic policies should be formulated to resist and overcome this emerging problem and to, implement a robust antimicrobial stewardship program, and stop the misuse of antibiotics with an instant effect. Our region's present study helped us see the actuality of the antibiotic sensitivity pattern of bacteria, which is not good. For reduction of the problem of antibiotic resistance, immediate steps must be taken as new antibiotic development is very quick. Otherwise, it will move us to the pre-antibiotic era, which would be a great step back for the human community.

Author's Contribution Statement: Mr. Vipin Kumar, Dr. Malvika, and Dr. Sachin Gupta studied the literature review and gathered the data about this work. Dr. Vipin Kumar Sharma, Dr. Swadesh, Dr. Kapil, and Dr. Ashwani & Rohan Kaushik analyzed these data and necessary inputs were given towards designing the manuscript. All Authors discussed the methodology and result and contributed to the final manuscript.

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CONFLICT OF INTEREST: The Authors confirm no conflict of interest.

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