

## Antimicrobial Resistance among Escherichia Coli Causing UTIs in Women

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### Abstract

Urinary tract infections (UTIs) are common bacterial infections, particularly in women. E. coli is one of the most frequently isolated bacteria in (UTIs), it also caused of childhood diarrhea, severe anemia, kidney failure, pneumonia, sinusitis and endocarditis. The current study tried to detecting Antimicrobial Resistance Among Escherichia coli Causing UTIs in women. Of the total 48 isolates of Escherichia coli, very high rates of resistance was seen with Ticarcillin 48 (100%), Piperacillin 48 (100%), Aztreonam 46 (95.8%), Cefepime and 44 (91.6%) Ceftazidime 44 (91.6%) . High rates of sensitive was seen with Imipenem 48 (100%), Meropenem 48 (100%), Amikacin 46(95.8%) , Gentamicin 32 (66.6%) , Piperacillin\Tazobactam 32(66.6%), Tobramycin 28 (58.3%) and ciprofloxacin 26(54.1%) , while of Minocycline 8 (16.6 %) has intermediate susceptibility to antibiotics study .According to the last results the most effective antibiotics were Meropenem , Imipenem and Amikacin so they are considered the best drugs used for treatment of UTIs which caused by Escherichia coli.

**Keywords:** *Antibiotics, E. coli, Urinary Tract Infection, Vitek, Antimicrobial Susstibility.*

### Introduction

Urinary Tract Infection (UTI) is an infection of one or more structures in the urinary system( 1) .This disease affects people of all age groups, being more common in women.(2). Acute urinary tract infections are common, occurring in 10% to 20% of otherwise healthy women during their lifetimes (3). UTI in males, though not rare, occurs in much less frequency (4).

Antibiotic resistance patterns vary in different areas (5) The prevalence of antimicrobial resistance in urinary pathogens is increasing worldwide. Escherichia coli is the most common cause of UTIs. E. coli urinary tract infections are sometimes called bladder infections, an E. coli UTI is the inflammation of any part of the urinary system. E. coli is a common bacteria that is found in the lower intestines and stool of many mammals. The bacterium when enter into urinary system, it multiplies and move up to urinary tract.(6) When that bacteria gets into the urinary system, it multiplies and travels up the urinary tract.

As it does, the E. coli attaches to the lining of the urinary tract, causing inflammation and irritation along the way. It can get into the urinary system through the urethra, the passage that carries the urine out of the body. Females have very short urethra's so they tend to have more problems with UTI's [ urinary tract infections].

After urinating it is important that women wipe from top to bottom so that they don't get E-Coli which are more numerous near the anus into their urethra they can migrate from the adjoining large intestine, travel up the urethra or may be introduced during catheterization uncommonly blood can be a cause E-coli bacteria could be present in urine if there is a fistula present.

A fistula is an abnormal connection between organs, such as bowel and bladder .The E. coli accounts for approximately 85% of community acquired UTIs and 50% of hospital acquired UTIs (7). Microorganisms use various mechanisms to develop drug

resistance, such as recombination of foreign DNA in bacterial chromosome, horizontal gene transfer and alteration in genetic material (8). Detection of UTI causing pathogens and resistance of these pathogens to commonly prescribed antibiotics in clinical set ups is essential and helpful in improving the efficacy of empirical treatment (9). In women between the ages of 16-35 years, the prevalence of urinary tract infection is approximately 20%. In addition, there are special considerations in the management of UTI among selected populations, including postmenopausal and pregnant women, and for women with frequent recurrent UTIs. The persistence of *E. coli* in bladder "biofilms" or in the fecal reservoir could explain recurrent infections in young women.

## Material and Methods

A number total of 48 clinical specimens was collected in AL- Hashmiya and AL-Hilla Hospital. The samples were collected under sterile conditions include sterile test tubes and swabs then transported immediately to the Microbiology laboratory to do Bacteriological study which includes culturing of Urine specimens with selective and differential media for *E.coli* such as Eosin methylene blue agar and Mac Conkey agar media, after that we have done microscopically, morphologically Biochemical investigations were done for bacteria identification (10, 11).

Moreover, colonies were stained by Gram stain, In addition isolates were also identified by using commercially available API 20 E kit (Bio Merieux, France). Finally Vitek2 susceptibility test was used to determine susceptibility of *Escherichia coli* to antibiotics by using Vitek2 technique according to the product Company (Bio Merieux).

## Results and Discussion

In the present study (48) patients out of 80 were shown to be urine culture positive (females).

Although *E. coli* was responsible for more than half of the UTI, its antimicrobial resistance was significantly lower than that presented by the other bacteria (12). Approximately 1 in 3 women will require antimicrobial treatment for a UTI before age 24, and 40% to 50% of women will have a UTI during their lifetime (13). *E. coli* strains

were the most common cause of UTI, which is in accordance with findings from other studies Faro (14).

The information of antibiotics resistance by *E.coli* is important because this pathogen associated with urinary tract infection, which is selecting as a guide for antimicrobial therapy (6) In addition other antibiotic resistance genes may also be present in the cassette rendering resistance to multiple antibiotics( 15).

Antimicrobial resistant isolates, especially those that are fluoroquinolone resistant and those producing extended-spectrum  $\beta$ -lactamases have increased significantly during the 2000's and in certain areas many nosocomial and community-acquired, *E. coli* are now resistant to the several important antimicrobial classes (16).

In Spain, the proportion of *E. coli* resistant to ampicillin in urine specimens reaches 50% and that resistance to TM-SM ranges from 27 to 49% (17) .Increasing resistance among community-acquired *Escherichia coli* to TMP-SMX worldwide has led to a reassessment of the most appropriate empiric therapy for these infections.

The elevated incidence of infection between the male and female genitourinary systems in anatomy and microflora (18).The results showed the age group (14-23) gives high percentages (41.6%),Table 2.because this ages are sexually active and the infection may be resulted from transmission from their husbands.

Based on results obtained from susceptibility testing (Table), the Bacteria recovered from UTI showed the highest degree of resistance to Ticarcillin 48 (100%), Piperacillin 48 (100%), Aztreonam 46 (95.8%), Cefepime and 44 (91.6%) Ceftazidime 44 (91.6%). High rates of sensitive was seen with Imipenem 48 (100%), Meropenem 48 (100%), Amikacin 46 (95.8%), Gentamicin 32 (66.6%), Piperacillin\Tazobactam 32(66.6%), Tobramycin 28 (58.3%) and ciprofloxacin 26(54.1%), while of Minocycline 8 (16.6 %) has intermediate susceptibility to antibiotics study. The sensitivity to Imipenem (100%) in our results were similar to another study of Gautametal (19) which (100%).

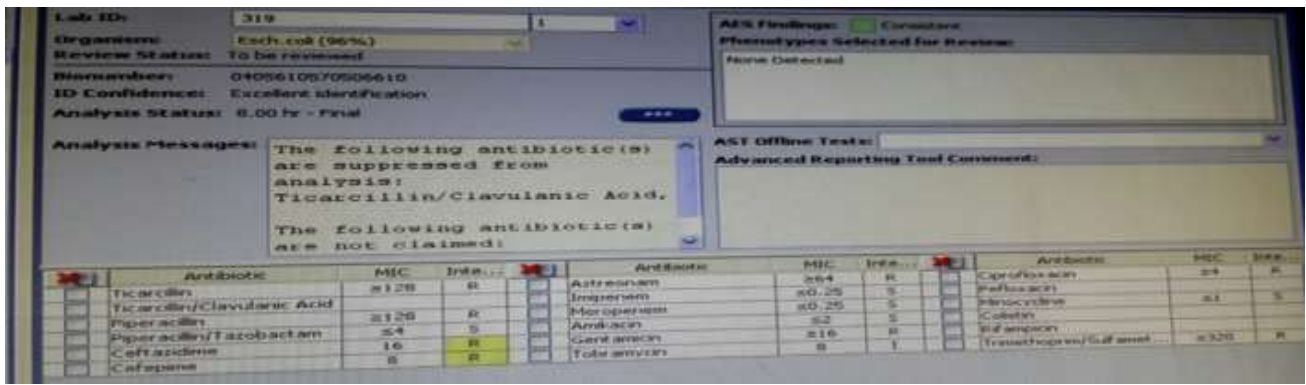


Figure 1: The resistant results of Escherichia coli isolates to the antibiotics

Table 1: The resistant results of Escherichia coli isolates to the antibiotics

Antibiotics	Resistance		Intermediate		Sensitive	
	No.	%	No.	%	No.	%
Ticarcillin	48	100	00	00.0	00	00.0
Piperacillin	48	100	00	00.0	00	00.0
Piperacillin\Tazobactam	04	08.4	12	25	32	66.6
Ceftazidime	44	91.6	02	04.2	02	04.2
Cefepime	44	91.6	02	04.2	02	04.2
Aztreonam	46	95.8	02	04.2	00	00.0
Imipenem	00	00.0	00	00.0	48	100
Meropenem	00	00.0	00	00.0	48	100
Amikacin	00	00.0	02	04.2	46	95.8
Gentamicin	12	25	04	08.4	32	66.6
Tobramycin	06	12.6	14	29.1	28	58.3
Ciprofloxacin	18	37.5	04	08.4	26	54.1
Minocycline	18	37.5	08	16.6	22	45.9
Trimethoprim\Sulfament	32	66.6	00	00.0	16	33.4

Table 2: Distrebuton the rite of infection according to age groups

Age \ year	No.	Percentage %
14-23	20	41.6%
24-33	12	25%
34-43	12	25%
44-53	4	8.4%
Total	48	100

**Conclusions**

- The percent of antibiotic sensitivity to Impanel and Meropenen 100%
- Young women in the age 14-23 are more exposed to urinary tract infection than other age groups.

urinary tract infection in women aand the role of vitek2 system in detection of antimicrobail susceptbility of bacteria.

- The current study suggests vitek2 technique as a important and differential test in some critical cases of urinary tract infections.

**Acknowledgments**

- Conduct an extensive study involving other governorates in Iraq to show the spread

- Conduct other academic studies, including Escherichia coli strains.

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