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Antibiotic Resistance among Escherichia Coli Isolated from Different Clinical Samples in Erbil City

Fattma A. Ali, Eman Mohammad Merza, Tavga Salah Aula

Hawler Medical university/College of Health Sciences, Iraq.

***Corresponding Author:** Fattma A. Ali, Hawler Medical university/College of Health Sciences, Iraq.*

ABSTRACT

Gram-negative bacilli Escherichia coli is an important pathogen in hospitalized patients, contributing to their morbidity and mortality due to its multiple resistance mechanisms. Therefore, as therapeutic options become restricted, the search for new agents is a priority. Latterly an accelerated increase in frequency of multidrug-resistant clinical strains has severely limited the availability of therapeutic options.In this study A total of (300) samples were collected from six different sources (urine, wound swab, pus, high vaginal swab, sputum and blood). Results showed that only (160) isolates were indicated as Escherichia coli. Clinical samples were collected from patients attending Rizgary hospital and Par hospital in Erbil city during the period October 2015 to February 2016. isolated of Escherichia coli were identified by using cultural, morphological, characteristics, and biochemical test and Vitek 2 system. 7(2.3%) were for HVS and sputum respectively, in addition pus 11(3.8%) and 5(1.7%) were for blood isolates ,10 (3.3%) were for wound swab.44 (27.5%) were from males and 116 (72.5%) from females. In the present study the higher rate of E.coli was found in females compared to males on the other hand the highest rate of E.coli causing UTI was found in female urine 95(81.90%) compared to 25 (56.80%)in male urine, while we don't isolated any bacteria from female sputum and equal isolate were isolated from wound.On the other hand, the lowest resistance were (1.25%) to Imipenem, (1.9%) for Meropenem and Amikacin, (3.8%) to Ertapenem and (8.1%) to Piperacillin/tazobactam, whereas highly resistance to Cefepime, Trimethoprim/Sulfamethoxazole, Ciprofloxacin and Gentamycin were (66.9%), (60%), (54.4%) and (40.6%) respectivelyOn the other hand our results indicated that most isolates of P.aeruginosa were multi resistance which show resistance to≥5 antibiotics.The problem of antimicrobial resistance in bacterial pathogens has been fairly described as a growing global crisis. Rate of reported resistance in common pathogens are reaching levels in many corners of the world preclude the empirical use of many our most potent and reliable antimicrobial agent.

Keywords: *Escherichia coli, wound infection ,antimicrobial resistance*

INTRODUCTION

The urinary tract infection, or UTI is an infection that can happen anywhere along the urinary tract. UTI have different names, depending on what part of urinary tract is infected [1]. Uropathogenic *Escherichia coli* (UPEC)is the most frequent agent causing UTI in adults and children [2]. Infected wounds are commonly encountered in medical practice raising issues of diagnosis and treatment because of the selection of bacterial strains resistant to antibiotics [3].This situation occurs for the strains of *E.coli*[4].Post-operative wound infections have been a problem in the field of surgery since time immemorial, these infections may occur shortly after surgery or several days post-operatively. Studies have shown that such wound infections are universal and that the bacteria types present vary with geographical locations .Although *staphylococcus aureus* are the primary cause of such infections, in recent years there has been a growing number of post-operative wound infections due to gram negative organisms mainly *E.coli* and *Pseudomonas aeruginosa* [5].desiccation and act as antiphagocytosis, anticomplement [6].Bacterial vaginosis is a syndrome that can be diagnosed both clinically and microbiologically. In vaginal samples the *E. coli* was found to be the most prevalent organism [7].Since the discovery and introduction of antibiotics, microbial resistance to antibiotics has steadily increased. In past years, development of resistance to antibiotics was not considered a serious problem because of the notion that there would always be a new antibiotic discovered but bacteria continue to develop resistance against each new drug created. However non – pathogenic bacteria can also acquire resistance genes and serve as a continuing source of

resistance for other bacteria , both in the environment and in the human gut[8].

Widespread use of antibiotics has undoubtedly caused the epidemics of antimicrobial resistance worldwide [9].

METHODS

Sample Collection

A total of (300)samples were collected from six different sources (urine, wound swab, pus, high vaginal swab, sputum and blood). After collection all bacterial isolates were subjected to a series of confirming tests. Results showed that only (160) isolates were indicated as *Escherichia coli*. Clinical samples were collected from patients attending Rizgary hospital and Par hospital in Erbil city during the period October 2015 to February 2016. Clean-Catch midstream urine of the patients was collected in a sterile tube (4-5ml) and immediately transported to the laboratory. Guidelines for proper specimen collection were given to all patients. Vaginal swabs were collected using sterile cotton swab by a nurse under the supervision of the attending Gynecologist without using a speculum from the lower vaginal wall . The swabs were immediately placed into Steuart ʾs tr ansport media and transported to the laboratory at room temperate within 5-6 hours.

Identification of Bacteria:

This includes shape of the cell and reaction to gram stain. Smears were prepared from isolated bacterial culture, stained with gram stain and examined under light microscope using oil immersion objective lens. In order to obtain maximal yield, specimens where inoculated to several culture media after incubation overnight at 37°C, the cultural characteristic of isolated bacterial colonies were identified[10].as following :

Vitek 2 Compact System

The newly redesigned colorimetric Vitek 2 compact system figure (2.2), with updated advanced expert system (AES) (bioMerieux, Marcy l'Etoile, France) was evaluated for its accuracy and rapidity to identify clinical isolates and to detect several antimicrobial resistance [11].Principles of the Vitek 2 is an automated microbiology system utilizing growth-based technology. This system accommodate the colorimetric reagent cards that are incubated and interpreted automatically. Overall, the Vitek 2 gave 95.8% of compatibility with the reference API strips (bioMerieux) in the identifications (ID) s of the Gram- positive cocci (GPC), Gram-negative rods (GNR), and yeasts. The accuracy was finally estimated to 98.3% through additional confirmatory tests. Also, > 90% of identifications of GPC and GNR were obtained within 7 hours of incubation. The most resistant isolates were identified within 12 hours of incubation. In conclusion, the new colorimetric Vitek 2 compact system with AES greatly improved is accuracy in species identification and detection of antimicrobial resistances, and it will be highly acceptable to clinical microbiology laboratory function [12].

Antimicrobial Susceptibility Test by Vitek 2 System

The system includes an AES that analyzes minimum inhibitory concentration (MIC) patterns and detects phenotypes for most organisms tested. This helps optimize laboratory efficiency for lean laboratory management. Rapid results allow clinicians to discontinue empiric therapy and prescribe targeted therapy, resulting in improved patient outcomes and enhanced antibiotic stewardship .With its ability to provide accurate "fingerprint" recognition of bacterial resistance mechanisms and phenotypes, the AES is a critical component of Vitek 2 technology .The Vitek 2 card contains 64 microwells. Each well contains identification substrates or antimicrobial. Vitek 2 offers a comprehensive menu for the identification and antibiotic susceptibility testing of organisms [13]. The Vitek 2 test card is sealed, which minimizes aerosols, spills, and personal contamination. Disposable waste is reduced by more than 80% over microtiter methods.

RESULTS AND DISCUSSION

The Incidence of Escherichia Coli Sp. in Different Clinical Specimens

One hundred sixty *E.coli* isolates distribution according to their source of isolation as in table (31)and figure (1), our result showed that urine isolates are the most frequent encountered 120(40%), while for HVS and sputum were 7(2.3%) respectively, in addition pus 11(3.8%) and 5(1.7%) were for blood isolates finally 10 (3.3%) were for wound swab. All *Escherichia coli* isolates characterized by producing small, smooth, entire, convex, grayish white moderately opaque colonies with zone of hemolysis on Blood agar. There are red pink colonies on MacCkonkey agar as lactose fermenters, and by producing bright metallic

green sheen colonies on Eosin methylene blue agar. While the microscopic features were gram negative bacilli, non spores former [14].

Table1. *The incidence of Escherichia coli spp.in different specimens.*

Patients	No and % of *E.coli* isolates						Total
	Urine	Pus	Blood	Sputum	HVS	Wound swab	
	Number and %						
Infected	120	11	5	7	7	10	160
	40%	3.8%	1.7%	2.3%	2.3%	3.3%	53.4%
Uninfected	105	10	4	6	6	9	140
	35%	3.3%	1.3%	2%	2%	3%	46.6%
Total	225	21	9	13	13	19	300
	75%	7.1%	3%	4.33%	4.33%	6.3%	100%

All bacterial isolates were subjected to a series of confirming tests to ensure that these isolates recovered belong to *Escherichia coli.* These bacterial cells from smear preparation are gram negative rods, motile, non-spore forming, arranged in single or short chain. All *Escherichia coli* isolated and identified by using microscopical, morphological, biochemical tests, Api 20 E and Vitek 2 . A total of (300) samples were collected from six different sources (urine, pus, blood, sputum, High vaginal swab, wound swab). After collection all bacterial isolates were subjected to a series of confirming tests. Results showed that only (160) isolates were indicated as *Escherichia coli.* The results in table (1) showed that we are collected a total of 160(53.4%) *Escherichia coli* positive out of 300 from different clinical samples, our study higher than [15]. who were collected (95) samples only (64) isolates were indicated as *Escherichia coli.* urine sample appeared to be the most dominant specimen than other specimens.

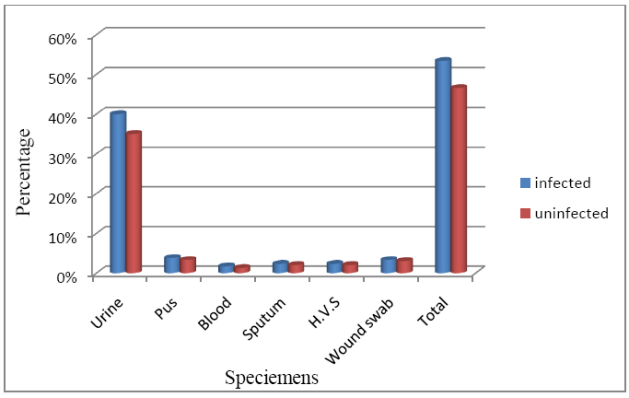

Figure1. *The incidence of Escherichia coli spp.in different clinical specimens.*

The total of urine in our study 120(75%) that agreement with those reported byHamid ,[15]. who found *E.coli* causing urinary tract infection was (62.1 %). The isolated percentage of high vaginal swab(2.3%) our study consistent withAl-Haddad, [16].Who found that (10.93%) of *E.coli* isolated in female vaginal. The percentage of wound swab is 10(3.3%) our study lower than results recorded by Mohamed and Al- Thwani, [17]. which is (14.5%).

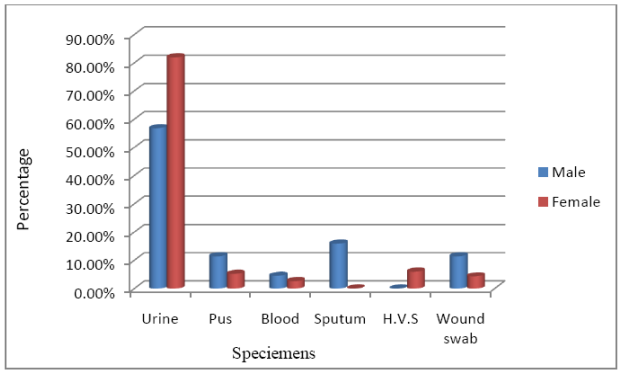

Figure2. *Distribution of Escherichia coli in relation with gender in different clinical specimens .*

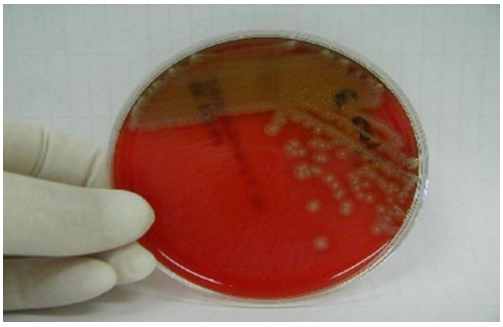

Figure3-2. *Hemolysis zone of E.coli on Blood agar*

Figure3-3. *MacConkey agar for E.coli (Lactose fermentation)*

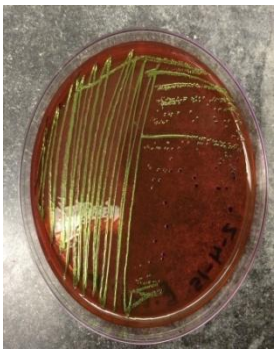

Figure3-4. *Eosin methylene blue for E.coli (Metallic sheen appearance)*

Distribution of Escherichia Coli in Relation with Gender in Different Clinical Specimens

After the interpretation of the data we found that the prevalence of *E.coli* was analysed according to person's gen der in table(2) and figure(2) among the 160 positive growth 44 (27.5%) were from males and 116 (72.5%) from females. In the present study the higher rate of *E.coli* was found in females compared to males on the other hand the highest rate of *E.coli* causing UTI was found in female urine 95(81.90%) compared to 25 (56.80%)in male urine, while we don't isolated any bacteria from female sputum and equal isolate were isolated from wound. After the interpretation of the data we found that the prevalence of *E.coli* was analysed according to person's gender in table (2) among the 160 positive growth 44 (27.5%) were from males and 116 (72.5%) from females. In the present study the higher rate of *E.coli* was found in females compared to males. Our results agree with that recorded by (Mahde, *et al*., [18].Also our study is in close agree with study done by Mahdenejad *et al*., [19].who found that (68%) of *E.coli* isolates are females. In our study, the higher rate of *E. coli* was found in females urine 95 (81.90%) compared to 25 (56.80%) males urine. The higher incidence of urinary tract infections in females is due to unique anatomical features of the female genitourinary tract, which include a shorter urethra and the more proximal location of the urethral meatus to the anus makes it easy for bacteria to ascend in the urinary tract.

Table2. *Distribution of Escherichia coli in relation with gender in different clinical specimens:*

Patients	No and % of *E.coli* isolates						Total
	Urine	Pus	Blood	Sputum	HVS	Wound swab	
	Number and %						
Male	25	5	2	7	0	5	44
	56.80%	11.40%	4.50%	15.90%	0%	11.40%	27.50%
Female	95	6	3	0	7	5	116
	81.90%	5.20%	2.60%	0%	6%	4.30%	72.50%
Total	120	11	5	7	7	10	160
	75%	6.80%	3.10%	4.40%	4.40%	6.30%	100%

Antibiotic Resistance Patterns for *Escherichia Coli* Isolates

The antibiotic resistance patterns of one hundred sixty *E.coli* isolates were screened for their resistance to eleven widely used antibiotics (Gentamycin, Ciprofloxacin, Imipenem, Cefepime, Piperacillin / tazobactum, Ertapenem, Trimethoprim/ sulfamethoxazole, Meropenem,

Ceftriaxone, Ampicillin, Amikacin). The antibiotic resistance patterns are shown in table (3). The bacterial isolates revealed remarkable variation in their resistance to antibiotics used, but in general most isolates of *E.coli* were multidrug resistance to more than four antibiotics. it is obvious that *E.coli* isolates showed high resistance (97.5%) to Ampicillin, (83.8%) to Ceftriaxone. On the other hand, the lowest resistance were (1.25%) to Imipenem, (1.9%) for Meropenem and Amikacin, (3.8%) to Ertapenem and (8.1%) to Piperacillin/ tazobactam, whereas highly resistance to Cefepime, Trimethoprim/ Sulfamethoxazole, Ciprofloxacin and Gentamycin were (66.9%), (60%), (54.4%) and (40.6%) respectively. The indiscriminate use of antimicrobials over prolonged periods has led to the emergence of multi drug resistant (MDR) strains. Whenever a new and effective antibiotic is introduced, bacteria after exposure to this antimicrobial, acquire resistance through different ways. In present study, the most sensitive antibiotics against *E.coli* infection isolates were Imepenem, Amikacin, Meropenem, Ertapenem and Piperacillin/ tazobactam in table (3) these result do agree with that researched by Mahde, *et al* ., [18]. stated that the Imepenem, Meropenem, Ertapenem and Piperacillin/ tazobactam are effective for *E.coli* infection on the other hand our result consistant with that study done by Valdivieso *et al*., [20]. They found that 98.7% of *E.coli* isolates were sensitive to Amikacin. The bacterial isolates revealed remarkable variation in their resistance to antibiotics used, but in general most isolates of *E.coli* were multi resistance to more than five antibiotics. Resistance to antimicrobials is highly prevalent in bacterial isolates worldwide, particularly in developing countries. Normal intestinal flora reservoir for resistance genes; the prevalence of resistance in commensal *E.coli* is a useful indicator of antibiotic resistant in bacteria in the community. Oral administration of antibiotics can also influence the normal intestinal micro flora and can lead to an overgrowth of resistant strains.

Table3. *Antibiotic resistance patterns for Escherichia coli isolates:*

Isolates	Antibiotics											NO. R	NO. S
	GM	CIP	IPM	CPE	TZP	ETP	SXT	MEM	CRO	AM	AK		
E1	S	R	S	R	S	S	R	S	R	R	S	5	6
E2	S	R	S	R	S	S	R	S	R	R	S	5	6
E3	S	S	S	R	S	S	S	S	R	R	S	3	8
E4	S	S	S	R	S	S	S	S	S	R	S	2	9
E5	R	R	S	R	S	S	R	S	R	R	S	6	5
E6	S	S	S	S	S	R	S	S	R	R	S	3	8
E7	R	R	S	R	S	S	R	S	R	R	S	6	5
E8	S	S	S	R	R	S	R	S	R	R	S	5	6
E9	S	S	S	R	S	S	R	S	S	R	S	3	8
E10	S	S	S	R	S	S	S	S	R	R	S	3	8
E11	S	S	S	R	S	S	R	S	R	R	S	4	7
E12	S	R	R	R	R	R	R	R	S	R	S	8	3
E13	S	S	S	R	S	S	R	S	R	R	S	4	7
E14	S	R	S	R	S	S	R	S	R	R	S	5	6
E15	S	S	S	R	S	S	R	S	R	R	S	4	7
E16	S	S	S	R	S	S	R	S	R	R	S	4	7
E17	S	S	S	R	S	S	S	S	R	R	S	3	8
E18	R	S	S	R	S	S	R	S	R	R	S	5	6
E19	S	R	S	R	S	S	R	S	R	R	S	5	6
E20	S	S	S	R	S	S	S	S	R	R	S	3	8
E21	S	S	S	R	S	S	S	S	R	R	S	3	8
E22	S	S	S	S	S	S	S	S	S	S	S	0	11
E23	R	S	S	R	S	S	S	S	R	R	S	4	7
E24	S	S	S	R	S	S	R	S	R	R	S	4	7
E25	S	S	S	R	S	S	R	S	R	R	S	4	7
E26	S	R	S	R	S	S	R	S	R	R	S	5	6
E27	R	R	S	R	S	S	R	S	R	R	S	6	5
E28	S	S	S	S	R	S	R	S	S	R	S	3	8
E29	S	R	S	R	S	S	S	S	R	R	S	4	7
E30	S	S	S	R	S	S	R	S	R	R	S	4	7

E31	S	R	R	R	R	R	S	S	R	R	S	7	4
E32	R	R	S	R	S	S	R	S	R	R	S	6	5
E33	S	S	S	R	R	S	R	S	S	R	S	4	7
E34	R	R	S	R	S	S	R	S	R	R	S	6	5
E35	R	S	S	R	S	S	S	S	R	R	S	4	7
E36	R	R	S	R	S	S	R	S	R	R	S	6	5
E37	S	R	S	R	S	S	R	S	R	R	S	5	6
E38	R	S	S	R	S	S	R	S	R	R	S	5	6
E39	S	S	S	R	S	S	R	S	R	R	S	4	7
E40	R	S	S	R	S	S	R	S	R	R	S	5	6
E41	R	S	S	R	S	S	R	S	R	R	S	5	6
E42	S	R	S	R	S	S	R	S	R	R	S	5	6
E43	S	S	S	R	S	S	S	S	R	R	S	3	8
E44	R	R	S	R	S	S	R	S	R	R	S	6	5
E45	R	R	S	R	R	S	S	S	R	R	S	6	5
E46	S	S	S	R	S	S	S	S	S	R	S	2	9
E47	S	S	S	R	S	S	R	S	R	R	S	4	7
E48	R	R	S	R	S	S	R	S	R	R	S	6	5
E49	S	S	S	R	S	R	S	S	R	R	S	4	7
E50	R	S	S	R	S	S	S	S	R	R	S	4	7
E51	S	S	S	R	S	S	R	S	R	R	S	4	7
E52	R	S	S	R	S	S	R	S	R	R	S	5	6
E53	S	S	S	R	S	S	R	S	S	R	S	3	8
E54	S	S	S	R	S	S	R	S	R	R	S	4	7
E55	R	R	S	R	S	S	R	S	R	R	S	6	5
E56	R	R	S	R	S	S	R	S	R	R	S	6	5
E57	S	S	S	R	S	S	R	S	R	R	S	4	7
E58	S	S	S	R	S	S	R	S	R	R	S	4	7
E59	S	S	S	R	S	S	R	S	R	R	S	4	7
E60	S	S	S	R	R	S	S	S	R	R	S	4	7
E61	S	R	S	S	S	S	R	S	S	R	S	3	8
E62	R	R	S	R	S	S	R	S	R	R	S	6	5
E63	R	R	S	R	S	S	S	S	R	R	S	5	6
E64	S	S	S	R	S	S	S	S	R	R	S	3	8
E65	S	S	S	R	S	S	S	S	R	R	S	3	8
E66	R	R	S	R	S	S	R	S	R	R	S	6	5
E67	R	R	S	R	S	S	R	S	R	R	S	6	5
E68	S	S	S	R	S	S	R	S	R	R	S	4	7
E69	S	R	S	R	S	S	R	S	R	R	S	5	6
E70	R	R	S	R	S	S	R	S	R	R	S	6	5
E71	R	R	S	R	R	S	R	S	R	R	S	7	4
E72	S	R	S	R	S	S	S	S	R	R	S	4	7
E73	S	S	S	R	S	S	S	S	R	R	S	3	8
E74	R	R	S	R	S	S	R	R	R	R	S	7	4
E75	R	S	S	R	S	S	S	S	R	R	S	4	7
E76	R	R	S	R	R	S	S	S	R	R	S	6	5
E77	R	R	S	R	S	S	R	S	R	R	S	6	5
E78	R	R	S	R	S	S	R	S	R	R	S	6	5
E79	R	S	S	R	S	S	R	S	R	R	S	5	6
E80	R	R	S	R	S	S	R	S	R	R	S	6	5
E81	R	R	S	R	R	S	S	S	R	R	S	6	5
E82	S	R	S	R	S	S	R	S	R	R	S	5	6
E83	S	S	S	R	S	S	S	S	R	R	S	3	8
E84	R	R	S	R	S	S	S	S	S	R	S	4	7
E85	S	R	S	R	S	R	R	S	R	R	S	6	5
E86	S	S	S	R	S	S	R	S	R	R	S	4	7
E87	R	S	S	R	S	S	S	S	R	R	S	4	7
E88	S	R	S	R	S	S	R	S	R	R	S	5	6
E89	R	R	S	R	S	S	R	S	R	R	S	6	5
E90	S	S	S	R	S	S	S	S	R	R	S	3	8

E91	R	S	S	R	S	S	R	S	R	R	S	5	6
E92	R	R	S	R	S	S	S	S	R	R	R	6	5
E93	R	R	S	R	S	S	R	R	R	R	S	7	4
E94	S	S	S	R	S	S	R	S	R	R	S	4	7
E95	S	S	S	R	S	S	S	S	R	R	S	3	8
E96	R	S	S	R	S	S	R	S	R	R	S	5	6
E97	R	R	S	R	S	S	S	S	R	R	S	5	6
E98	S	R	S	R	S	S	R	S	R	R	S	5	6
E99	S	S	S	R	S	S	R	S	R	R	S	4	7
E100	R	R	S	R	S	S	R	S	S	R	S	5	6
E101	S	S	S	R	S	S	S	S	R	R	S	3	8
E102	S	R	S	S	S	S	R	S	R	R	S	4	7
E103	R	R	S	S	S	S	R	S	S	R	S	4	7
E104	R	R	S	S	S	S	R	S	S	R	S	4	7
E105	R	R	S	S	S	S	R	S	R	R	S	5	6
E106	S	S	S	S	S	S	R	S	R	R	S	3	8
E107	S	R	S	R	S	S	R	S	R	R	S	5	6
E108	R	R	S	R	R	S	R	S	R	R	S	7	4
E109	R	R	S	S	S	S	R	S	R	R	S	5	6
E110	R	R	S	R	S	S	R	S	R	R	R	7	4
E111	S	R	S	S	S	S	R	S	R	R	S	4	7
E112	S	R	S	S	S	S	R	S	S	R	S	3	8
E113	S	S	S	S	S	S	S	S	R	R	S	2	9
E114	R	R	S	S	S	S	S	S	R	R	S	4	7
E115	S	R	S	S	S	S	S	S	R	R	S	3	8
E116	S	S	S	S	S	S	R	S	S	R	S	2	9
E117	R	R	S	S	S	S	S	S	R	R	S	4	7
E118	S	R	S	S	S	S	S	S	S	R	S	2	9
E119	R	R	S	S	S	S	S	S	R	R	S	4	7
E120	R	S	S	S	S	S	S	S	R	R	S	3	8
E121	R	R	S	S	S	S	R	S	R	R	R	6	5
E122	S	R	S	S	S	S	S	S	S	R	S	2	9
E123	S	S	S	S	S	S	S	S	S	S	S	0	11
E124	S	R	S	S	S	S	R	S	R	R	S	4	7
E125	S	R	S	S	S	S	R	S	R	R	S	4	7
E126	S	S	S	S	S	S	S	S	R	R	S	2	9
E127	S	S	S	S	S	S	S	S	S	R	S	1	10
E128	R	S	S	S	S	S	R	S	R	R	S	4	7
E129	R	S	S	R	S	S	R	S	R	R	S	5	6
E130	S	S	S	S	S	S	R	S	R	R	S	3	8
E131	R	R	S	S	S	S	S	S	R	R	S	4	7
E132	R	R	S	R	R	S	R	S	R	R	S	7	4
E133	S	R	S	R	S	S	R	S	R	R	S	5	6
E134	S	S	S	S	S	S	S	S	S	S	S	0	11
E135	R	R	S	S	S	S	R	S	R	R	S	5	6
E136	S	S	S	S	S	S	R	S	R	R	S	3	8
E137	S	R	S	S	S	S	S	S	R	R	S	3	8
E138	S	S	S	S	S	S	S	S	R	R	S	2	9
E139	S	R	S	S	S	S	R	S	R	R	S	4	7
E140	R	R	S	S	R	R	R	S	R	R	S	7	4
E141	S	R	S	S	S	S	S	S	S	R	S	2	9
E142	S	R	S	S	S	S	S	S	S	R	S	2	9
E143	S	S	S	S	S	S	S	S	R	R	S	2	9
E144	R	R	S	S	S	S	S	S	S	S	S	2	9
E145	S	R	S	S	S	S	R	S	R	R	S	4	7
E146	R	R	S	S	S	S	S	S	R	R	S	4	7
E147	R	S	S	R	S	S	S	S	R	R	S	4	7
E148	S	R	S	S	S	S	S	S	R	R	S	3	8
E149	S	S	S	S	S	S	R	S	R	R	S	3	8
E150	S	R	S	S	S	S	R	S	R	R	S	4	7

E151	R	R	S	S	S	S	S	S	R	R	S	4	7
E152	S	R	S	S	S	S	S	S	R	R	S	3	8
E153	S	R	S	S	S	S	R	S	R	R	S	4	7
E154	R	R	S	R	S	S	S	S	R	R	S	5	6
E155	S	R	S	R	S	S	S	S	R	R	S	4	7
E156	S	R	S	S	S	S	S	S	R	R	S	3	8
E157	S	S	S	S	S	S	S	S	S	R	S	1	10
E158	R	R	S	S	S	S	S	S	S	R	S	3	8
E159	S	S	S	S	S	S	R	S	S	R	S	2	9
E160	S	R	S	R	S	S	S	S	R	R	S	4	7

The Number and Percentage of Antibiotic Resistance among *E.coli*

Table (4) and figure (3)shows the percentage of antibiotic resistant in *E.coli* which the results revealed high resistant to Ampicillin 97.5% similar results were recorded by Abd-Alsattar, [21] and Shirazi *et al* ., [22]. they found that resistant of *E.coli* infections to Ampicillin 90% and 92% respectively. Al- Fahdawi, [23]. and Al-Alosi, [24]. stated that no *E.coli* isolates were sensitive to Ampicillin, also our result agreed with other studies done by Farshad, [25]. they found that Ampicillin resistance percent was 85.5% among *E.coli* isolated. The second most frequent resistance observed in this work was to Ceftriaxone 83.8% disagree results obtained by Mahdenejad *et al*., [19]. who reported that 9.5% of *E.coli* isolates were resistant to Ceftriaxone. All isolates were resistance to Cefepime (66.9%) and 60% for Trimethoprim/ Sulfamethoxazole was reported in our study its agreement with results obtained by Banerjee, [26].This high rate of resistant to Ampicillin, Ceftriaxone, Cefepime and Trimethoprim/ Sulfamethoxazole may reflect the fact that these are the most commonly prescribed antibiotics in hospital and also the most easily available in the community without prescription and because they are very cheap terms of cost, and so subject to abuse and misuse of antibiotic. This high resistant may be also due to the spontaneous and there are no control on take the drugs, and about 50% of it given to outpatients without physicians prescription are from outside of hospital, as well as the occurrence of any infection in the organ of patient, they taking antibiotics without culturing and determination of antibiotic susceptibility for its side effect, the emergence of different types of antibiotic.

Table4. *The number and percentage of antibiotic resistance among E.coli:*

Antibiotic	No. Resistance Isolates	% Resistance
GM	65	40.6%
CIP	87	54.4%
IPM	2	1.25%
CPE	107	66.9%
TZP	13	8.1%
ETP	6	3.8%
SXT	96	60%
MEM	3	1.9%
CRO	134	83.8%
AM	156	97.5%
AK	3	1.9%

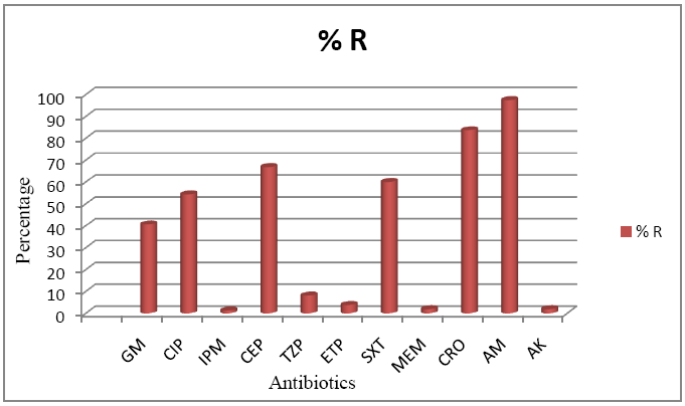

Figure3. *The number and percentage of antibiotic resistance among E.coli.*

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