CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES
https://cajmns.centralasianstudies.org/index.php/CAJMNS
Volume: 05 Issue: 04 | October 2024 ISSN: 2660-4159

Article

Detection The Uropathogens That Cause Urinary Tract Infections In Women And Their Antibiotic Sensitivity In Kerbala Governorate

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Abstract: Urinary tract infections (UTIs) are serious serious 21st-century worldwide health issue that annually affects millions of men and women of all ages. The risk of a UTI is 30 times higher in women than in males. At some point in their life, up to 60% of women will experience a UTI. A UTI is defined as the presence of microbial pathogens in the urinary tract and affects various regions of the urinary tract. The purpose of the current investigation was to identify the agents responsible for women's UTIs and the degree of antibiotic sensitivity.Sixty urine samples were collected from women with UTIs from Al-Haydaria and Al-Khairat Center Hospitals. The urine samples were transported to the College of Applied Medical Sciences-department of Environmental Health-Microbiology laboratory and aerobically cultivated on the bacterial media Nutrient agar, MacConkey agar, Mannitol salt agar, and Blood agar media, then, after detecting the bacterial causative agents of UTIs in women. Antibiotic sensitivity testing was performed for the bacterial isolates according to Kirby-Bauer's disc diffusion method. In The Results, from sixty urine samples, Gram's Negative bacteria represented by Escherichia coli were 38 (63.33%) with the significant importance, then, Gram's positive bacteria represented by Staphylococcus aureus and Staphylococcus saprophyticus were 8 (13.33%) and Mixed (G-ve and G+ve) bacteria were 14 (23.33%) in both Al-Haydaria and Al-Khairat Center Hospitals. in the present study the most 39/60 (65%) of affected women with UTIs were between (17–30) years old. As well as, Most Gram's negative bacteria were sensitive to Ciprofloxacin, Amoxicillin, and Amikacin, and were resistant to Azthromycin, and Ceftazidim, on the other hand, Gram's positive bacteria had intermediate resistance reactions to Ciprofloxacin, and Amikacin, as well as, Gram's positive bacteria were resistant to Azthromycin, Gentamycin, Ceftazidim, and Amoxicillin Antibiotic sensitivity tests revealed that the most effective antibiotics against Gram's negative bacteria were Ciprofloxacin, Amoxicillin, and Amikacin, moreover, Gram's positive bacteria had intermediate resistance against Ciprofloxacin, and Amikacin so, these antibiotics can be considered as drugs of choice for treatment of women with the clinical signs of UTIs who attended both Al-Haydaria and Al-Khairat Center Hospitals.

Keywords: Urinary Tract Infection In Women, Uropathogens, Antibiotic Sensitivity Testing.

Citation Eman Hassan Ali. Detection The Uropathogens That Cause Urinary Tract Infections In Women And Their Antibiotic Sensitivity In Kerbala Governorate:. Central Asian Journal of Medical and Natural Science 2024, 5(4), 309-326.

Received: 10th Jul 2024
Revised: 11th Agt 2024
Accepted: 24th Sep 2024
Published: 27th Okt 2024

1. Introduction

Each year, millions of people are impacted by the severe health issue known as urinary tract infections (UTIs) (1). The risk of a UTI is 30 times higher in women than in

males. At some point in their life, up to 60% of women will get a UTI (2). (UTI) is the 21st century's most pressing and difficult global health issue. UTIs, or urinary tract infections, are a leading cause of morbidity in people of all ages, including men and women. They are described as microbial pathogens that impact different parts of the urinary tract and are present in the urinary system (3). Any part of the urinary tract can get infected with a urinary tract infection (UTI) in women. When a UTI affects the lower urinary tract, it is referred to as cystitis, and when it affects the upper urinary tract, it is referred to as pyelonephritis (4). A urinary tract infection (UTI) is defined as having more than 100,000 microscopic cells in one milliliter of urine, along with clinical signs of cystitis, pyelonephritis, and asymptomatic bacteria.(5).UTIs affect people of both sexes and at different ages due to hormonal activity and the near closeness of the female urethra to the anus.

But the majority of UTI instances are brought on by bacteria, especially stomach germs, which contaminate the area around the rectum and move to the bladder, infecting the urethra.(6). Moreover, UTIs rank among the most prevalent issues for women, particularly during pregnancy. Ten to twenty percent of women are thought to get UTIs (7). Numerous research have examined the fact that UTIs, which impact 150 million individuals annually globally, are among the most prevalent forms of bacterial infections (8).

Eight million UTI episodes are reported to take place in the US each year, according per the National Institutes of Health (9). Furthermore, Naber et al. revealed in Surveillance research in In terms of clinical characteristics and the epidemiology of antibiotic resistance in women with cystitis, studies conducted in Europe and Brazil have shown that every year, one million ER visits, 8.3 million outpatient clinic visits, and 100,000 hospital admissions are related to UTIs (10). Urinary tract infections (UTIs) are a significant clinical bacterial infection type that are more common in women than in males (8:1). One in three women and one in twenty men will get a UTI at some point, according to past research.

point in their lives, with women being more susceptible to re-infection (11). One in three women need treatment for a urinary tract infection (UTI) before the age of 24. (12) and roughly 50–60% of Every woman will experience a UTI at some point in their lives (13). UTIs can be caused by a wide variety of infections. Enterococcus faecalis, Proteus mirabilis, Staphylococcus saprophyticus, Klebsiella pneumonia, and Escherichia coli are frequently implicated in the induction of UTIs (14). Due to its frequent presence in the gastrointestinal and urinary tract lining cells, Escherichia coli has been widely acknowledged to be the most prevalent pathogenic bacteria (80–85%) (15).

Several therapies were used to reduce the morbidity of UTIs. According to earlier research, cephalosporins and penicillin are safe antibacterial treatments for urinary tract infections (UTIs) and during pregnancy. On the other hand, fluoroquinolones, sulphonamides, and trimethoprim should be avoided. The most effective antibiotic agent is chosen based depending on several elements, such as the patient's past resistance, side effects, medication interactions, expense, the degree of the urinary complaint, the susceptibility of the causing bacteria, and urine pathogen concentrations. Generally, oral antibiotic therapy is effective. in treating 94% of uncomplicated UTIs, though recurrence is not unusual (5). Antibiotic treatment is a frequent practice for patients with symptomatic UTIs; however, this approach may disrupt the normal microbiota of the gastrointestinal

tract and vagina over time and lead to the emergence of multidrug-resistant microorganisms (16).

The possibility of multidrug-resistant uropathogen colonization can be heightened by the presence of niches that the changed microbiota has ceased to occupy. Significantly, the "golden age" of antibiotics is ending, which means that more carefully thought-out alternative treatments are required. Uropathogens from the urine of women with symptomatic UTIs have been directly analyzed using RNA sequencing in recent investigations (17). Many medicines are available to treat urinary tract infections (UTIs), but appropriate empirical treatment is a dynamic target due to changes in antibiotic sensitivity over time (18).

The primary treatment for urinary tract infections (UTIs) is antimicrobial therapy, which aims to remove bacterial development in the urinary system by using an antimicrobial drug that is safe, effective, and affordable. If the concentration of antibiotics is kept at appropriate urine levels, this goal can be accomplished quickly (19).Aim of the study Finding the causing factors and antibacterial activity of female urinary tract infections was the main goal of the current investigation.

A urinary tract infection occurs when bacteria get past the body's robust natural defenses and invade one or more urinary system components. One major factor contributing to human sickness is UTIs (urinary tract infections) (20). One common medical condition that has an erratic natural history is urinary tract infections (UTIs). Many UTIs clear up on their own, but some can worsen and endanger the kidneys. The infection process can affect nearby structures such as the male epididymis and prostate, as well as the kidney, renal pelvis, ureters, bladder, and urethra. UTIs are a significant side effect of renal disease, diabetes, kidney transplants, and structural neurological diseases that impair the flow of urine. Moreover, urinary tract infections account for more than half of all nosocomial infections brought on by urinary catheters and are the primary cause of Gram-negative sepsis in hospitalized patients. (21).

Age, sex, and risk factors that compromise the immune system that keeps the normal urinary tract sterile all have a significant impact on the frequency of urinary tract infections. Because of their shorter urethra and increased risk of anus and urethral injuries during sexual activity, women are more likely to experience urinary tract infections. Between 20 and 50 percent of women will get a urinary tract infection at some point in their lives; many of them experience repeated infections. Despite the fact that most infections are acute and transient, they nevertheless cause a considerable amount of morbidity and medical costs for the general public.

Due to anatomical and hormonal changes during pregnancy, the prevalence of bacteriuria in women rises steadily over time, reaching as high as 10% to 20% in older women. This can result in urinary tract infections, which can cause major difficulties for both the mother and the fetus. Research has indicated that the prevalence of bacteriuria, or the presence of bacteria in urine, is 1-2% in girls between the ages of 5 and 14. In addition, the varied symptology of UTIs in children and the challenge of obtaining appropriate urine samples make them challenging to diagnose (22).males and women can both contract urinary tract infections, but because of differences in physiology, women are more likely to contract them than males. Put simply, It can be characterized as a condition that is more common among pregnant women and that all women will surely encounter at some point

in their life. As the name implies, the diseased urinary system includes both the upper and lower urinary tracts. The infection is either phylonephritis (a kidney infection) or cystitis (a bladder infection), depending on which body organ is affected.

The symptoms of kidney and bladder infections are different from one another. For example, painful and frequent urination is often seen in cases of cystitis, which is caused by a bladder infection, while high fever and flank pain are common symptoms of kidney contagion, also known as phylonephritis (20).

Although bacteria are primarily to blame for urinary tract infections in humans, some fungi and viruses also play a significant role. On the other hand, the prevalence of UTI due to fungal or viral infection is thought to be an uncommon occurrence. Even while the infection initially appears to be innocuous, as the stage advances, the patient exhibits a range of symptoms, and in extreme cases, the infection can be fatal. Studies have shown that the most common kind of bacterial infections are urinary tract infections (21). Urinary tract infections are a common hospital acquired illness that might be caused by a poor diagnosis (23).

The term "UTIs" refers to a broad category of clinical syndromes and illnesses with varying epidemiologies, etiologies, and degrees of severity (24). In addition to the previously mentioned variables, they can differ in terms of stated local symptoms, frequency of recurrence, degree of damage done, existence of Bladder infections frequently culminate in kidney infections, which can cause bloodborne infections and, in extreme cases, grave outcomes, including death. As a result, UTIs can be fatal in extreme cases, and prompt medical attention ensures a speedy recovery from the infection. Beginning in the sixth week of pregnancy and continuing until the twenty-fourth week (26), the infection is present. Although the frequency of bacteriuria in pregnant women is comparable to that in non-pregnantwomen, pregnancy nevertheless raises a woman's risk of infection (27).

Other studies suggest that pregnancy increases the incidence of UTIs, albeit this is dependent on a number of other factors as well. Even while more research is necessary to fully understand the concept and determine the importance of pregnancy in connection to UTIs, the greater prevalence of UTIs during pregnancy cannot be interpreted as a general fact. Urinary tract infections (UTIs) are more common in pregnant women, however this complicated idea has not yet been thoroughly investigated and proven. Although many previous attempts and current initiatives have been made to gather relevant data to correlate the incidence of UTI during pregnancy,

Pregnancy is regarded as a critical period that necessitates a number of safety precautions to protect the mother and fetus. In addition to pregnancy, sexual activity and family history play a significant impact in the development of UTI (28).Cystitis, an infection of the lower urinary system caused by bacteria commonly found in the bladder, is followed by phylonephritis, an infection of the upper urinary tract. This can be a result of an infection transmitted by blood. As Gram positive cocci are one of the culprits responsible for causing UTIs, other pathogens are also involved, even though Escherichia coli accounts for 80% of the infection. Staphylococcus species is one of the primary infections that fall under the cocci group, and gram positive cocci are becoming more and more significant on a worldwide scale. It is well recognized that the microorganisms linked to urinary tract infections (UTIs) have a characteristic known as biofilm development, which is what initiates the infection (29).

2. Materials and Methods

Materials

The materials that used in the present research was put in the following table:

Table (1) Materials that used in the present research

Materials	Company
1-Blood agar medium	1. Blood agar medium from Media Labs PVT LTD India.
2-MacConkey agar medium	(Himedia laboratories pvt. ltd.india).
3-Nutrient agar medium	(Himedia laboratories pvt. ltd.india).
4- Manitol salt agar	(Himedia laboratories pvt. ltd.india).
5- Petri dishes	Local
6- Cotton swabs	Local
7- Mueller hinton agar medium	(Himedia laboratories pvt. ltd.india).
8- Antibiotic Sensitivity discs	
9- Gram crystal violet solution	CDH
10 - gram iodine solution	CDH
11- 90% Ethyl Alcohol (decolourizer)	CDH
12- gram safranine	CDH
13- Glass slides	Local
14- Inoculating loops	Local
15- Bunsen burner	FHS-09
16- Aerobic Incubator	Memmert
17- Filter papers	Local
18- Ethyl alcohol 70%	AL-Kafeel
19- Autoclave system	AB TECH
20- Light microscopes	Olympus
21- Normal Hood	FHS-09

Methods

1- Collection of Urine Samples

Thirty female patients, ages 17 to 60, who visited Al-Haydaria and Al-Khairat Center Hospitals between December 2022 and March 2023, had urine samples taken from the midstream flow of their urination using sterile plastic caps. These patients had clinical signs of urinary tract infections. Prior to the commencement of antibiotic medication, urine samples were taken.

Urine samples from the worried ladies were collected and sent straight to the Department of Applied Medical Sciences at the College of Applied Medical Sciences.of Environmental Health-Microbiology laboratory during less than one hour after collection for aerobic cultivation on bacterial culture media that previously prepared for cultivation and detection of bacterial causative agents of UTI in affected women.

2- Preparation of bacterial culture media:

1◎ Nutrient agar medium was made in accordance with the manufacturer's instructions by dissolving 28 grams of nutrient agar powder in one liter of distilled water. It was then autoclaved in an autoclaving system (at 121 degrees Celsius for 15-20 minutes and 1 bar), and once it cooled, it was transferred into 20–25 ml plastic petri dishes.

According to the manufacturer's instructions, 2◎ MacConkey agar media was made by dissolving 51.5 grams of MacConkey agar powder in one liter of distilled water. It was then autoclaved in an autoclaving system (at 121 degrees Celsius for 15-20 minutes and 1 bar), and once it cooled, it was transferred into 20–25 ml plastic petri dish plates.

Mannitol salt agar medium (3◎) was made in accordance with the manufacturer's instructions by dissolving 111 grams of powdered mannitol salt in one liter of distilled water. It was then autoclaved in an autoclaving system (at 121 degrees Celsius for 15-20 minutes and 1 bar), and once it cooled, it was transferred into 20–25 ml plastic petri dishes.

4◎ Blood agar medium was made in accordance with the manufacturer's instructions by dissolving 40 grams of blood agar powder in one liter of distilled water. It was then autoclaved in an autoclaving system (at 121 degrees Celsius for 1520 minutes and 1 bar). After cooling to 45 C, the medium was mixed with 5% fresh human blood and transferred into plastic petri dishes, with each dish holding 20 to 25 milliliters.

5- - 48 grams of Mueller hinton agar powder were dissolved in one liter of distilled water to create Mueller hinton agar medium, per the manufacturer's instructions. then, it was autoclaved in autoclaving system (at a temperature 121 degrees Celsius for 15-20 minutes and 1 bar), then, after cooling it was poured into a plastic petri dishes plates about 20-25ml /petri dish. This medium was prepared for antibiotics sensitivity testing of the uropathogens in urine samples.

3- Cultivation of bacterial culture media

All of the collected urine samples from women with urinary tract infections were cultivated on the following bacterial culture madia by using of standard loop technique to place about 0.03 ml of each urine sample prepared bacterial culture media one hour after the urine samples collection from affected women by streaking method (47), then, bacterial culture media were aerobically incubated at 37 degrees Celsius for 24-48 hours,

1- Cultivation on Nutrient agar medium

2- Cultivation on MacConkey agar medium

3- Cultivation on Manitol salt agar medium

4-Cultivation on Blood agar medium.

4- Diagnosis of the causative agents of UTI

Identification Among the UTI-causing agents

in women was done by detection of cultured bacteria in urine samples which performed according to the following parameters:-

A- Colony Morphology

inspection of the colony morphology after cultivation on the following bacterial media (MacConkey agar, Manitol salt agar, Blood agar, and Nutrient agar) and description of the cultured bacteria.

B- Grams stain procedure

Grams stain procedure which performed as the following steps:

1- Preparation of bacterial smears on glass slides and fixation.

2- Staining of the bacterial smears with basic stain Crystal Violet for 2 min. 3- Washing the bacterial smears with tab water and drying with filter paper.

4- Fixation of bacterial stain with the mordant Logals iodine solution for 2min.

5- Washing the bacterial smears with tab water and drying with filter paper.

6- Decolarization of bacterial smear with ethyl alcohol 90% for 5-10 seconds.

7- Washing the bacterial smears with tab water and drying with filter paper.

8- Staining of the bacterial smears with the counter stain Sofranin solution for 2 min.

9- Washing the bacterial smears with tab water and drying with filter paper.

10- Direct detection of bacterial morphology and staining reaction by the light microscope under the oil immersion lens.

11- Recording the detection results.

5- Antibiotic Sensitivity testing

For the majority of the bacterial isolates, antibiotic susceptibility testing was conducted using the disc diffusion method, which is part of Kirby-Bauer's technique, for the uropathogens found in the urine samples (48). The medications Ciprofloxacin,

Azithromycin, Gentamycin, Amoxicillin, and Ceftazidime were utilized for the antibiotic sensitivity test.

Antibiotics sensitivity testing was performed by diluting the bacterial isolates with normal saline solution approximate to the dilution of the McFarland standard tube (0.5 dilution),

Between 1 x 108 and 2 x 108 CFU/ml of E. coli, a bacterial suspension in MacFarlane tube NO. 5 = (0.5 ml of 1.175% BaCl2. 2H2O solution + 99.5 ml 0.36 N. (1%) H2sO4 sol.) and 0.5 McFarland standard is equal.

Then, cultivation was performed on previously prepared Mueller Hinton medium at (37º C) for 48 hours according to (49, 50). And (Bioanalyse susceptibility discs, Turkey) containing information about the antibiotics including standard concentrations of antibiotics and reactions of the tested bacteria against those types of antibiotics which are either Resistant or Intermediate resistance or susceptible (sensitive) bacteria. Reaction of the isolated bacteria were calculated, analyzed and recorded according to the manufacturing company.

3. Results and Discussion

Determination of the bacterial causative agents in urine samples of women with UTI was according to the following parameters:-

A- Characteristic bacterial colony morphology on selective media: as the followings:-

1. Cultivation on MacConkey agar medium which is the selective medium for Esherichia coli as well as other gram's negative bacteria demonstrate characteristic bacterial colonies which were large, small, concave, red with circle edge colonies as revealed in Figure no. 1 Cultivation on Staphylococcus aureus can be selectively grown on mannitol Salt Agar media.
2. revealed yellowish discoloration of the pink medium, as well as, white to yellowish, small and large, concave with circle edge colonies as demonstrated in Figure no. 2
3. Cultivation on Nutrient agar medium which allowed to growth both of Gram's positive and Gram's negative bacteria also displayed small, intermediate, large, white, grey, and yellowish, concave, with circle edge bacterial colonies that represented both Gram's positive and Gram's negative bacterial colonies as demonstrated in Figure no. 3
4. Cultivation on Blood agar medium which allowed to growth both of Gram's positive and Gram's negative bacteria as in Figure no. 4

and Gram's negative bacteria as in Figure no. 4

Figure number 1 Esherichia coli on MacConkey agar medium

Figure number – 2 Staphylococcus aureus on Mannitol Salt Agar medium

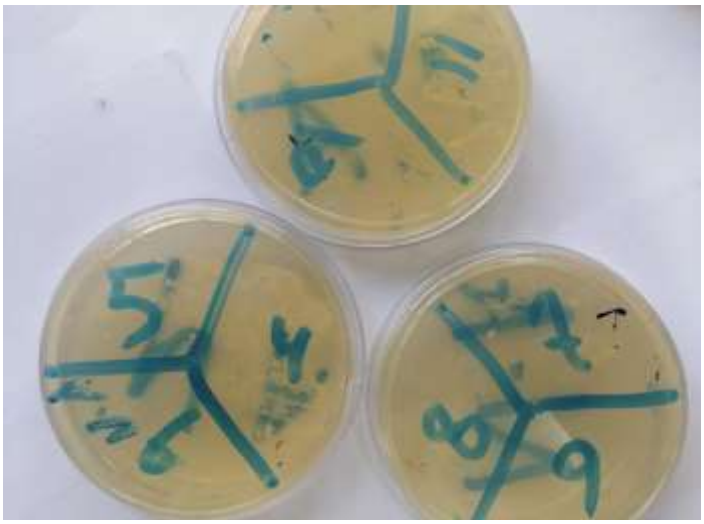

Figure number- 3 Nutrient agar medium with Gram's – ve and + ve bacteria

Figure number- 4 Blood agar medium with Gram's – ve and + ve bacteria

B. Gram's Staining Reaction :-

Gram's staining procedure of the bacterial smears from the cultivated plates of general and selective media revealed typical reaction and appearance of characteristic bacterial morphology of both Gram's positive cocci and Gram's negative bacilli, as well as,

mixture of both Gram's positive cocci and Gram's negative bacilli in the same slide when examined by light microscope under the oil immersion lens as shown in Figures no. (5, 6, and 7).

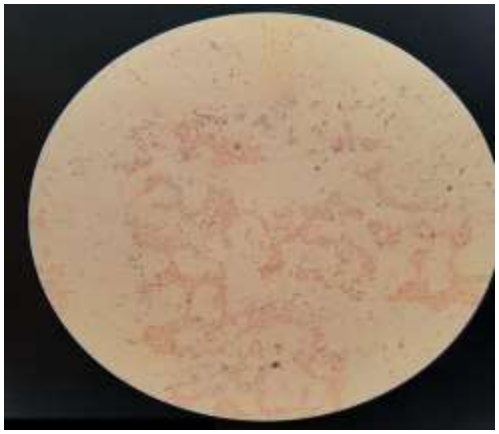

Figure number -5

Bacterial smear with Gram's –ve bacilli

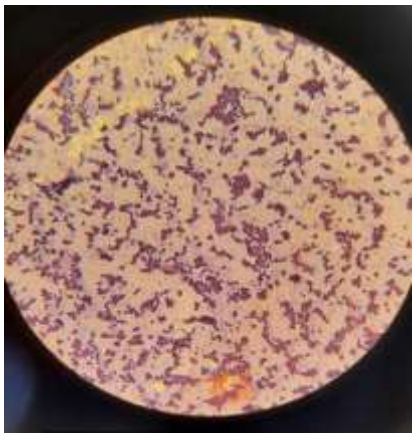

Figure number - 6

Bacterial smear with Gram's +ve cocci

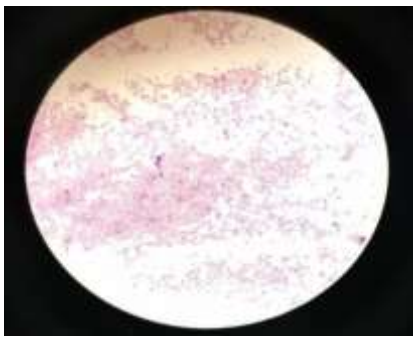

Figure number -7 Bacterial smear with mixed Gram's –ve bacilli and Gram's +ve cocci

From a total number of 30 urine samples of women with clinical signs of UTI of Al-Haydaria Hospital there were 20/ 30 (66.7 %) Gram's negative bacteria and 4 / 30 (13.3 %) Gram's positive bacteria, as well as, 6/30 (20 %) both of Gram's negative and Gram's positive bacteria, in addition to, from a total number 30 urine samples of women with the clinical signs of UTI of Al-Khairat Center Hospital there were 18/30 (60%) Gram's negative bacteria and 4/30(13.3%) Gram's positive bacteria as well as, 8 /30 (26.7 %) of both Gram's negative and Gram's positive bacteria, Furthermore, the total number of Gram's negative bacteria in urine samples of the women with UTI of Al-Haydaria and Al-Khairat Center Hospitals was 38/60 (63.33 %) as well as, the total number of Gram's positive bacteria in urine samples of the women with UTI of Al-Haydaria and AlKhairat Center Hospitals was 8/60 (13.33%) and the total number of mixed (Gve and G+ve) bacteria in the urine samples of both Hospitals was 14 /60 (23.33 %) as demonstrated in Table no. 2

Table 2: Number and percentage of uropathogens isolated from the urine samples from women with clinical signs of urinary tract infections

Uropathogens	Al-Haydaria Hospital women	Al-Khairat Center Hospital women	Total No. and percentage

Gram's Nagative bacteria	20 (66.7 %)	18 (60 %)	38 (63.33%)
Gram's positive bacteria	4 (13.3%)	4 (13.3%)	8 (13.33%)
Mixed (G-ve and G+ve) bacteria	6 (20 %)	8 (26.7 %)	14 (23.33%)
Total	30 (100%)	30 (100%)	60 (100%)
P= value	0.00		

The main causative agents of UTI is due to the fact of two types of infections ascending infection and/or descending infection or both, and transmission of the bacteria, fungi, and viruses from the bowel or anus to the urinary system in women throughout the portal of entry (vagina or urine orifice and urethra to the bladder) acceding the immune system barriers is the main causative mechanism of urinary tract infections, these mechanisms are agree with the most establishments of UTI in women as mentioned by similar study who suggested that The bacteria enter the bladder through the colon, where they attach and then form a bio-film that thwarts the body's defenses and is the primary source of the infection (30).

The results of the current study were compatible with results of previous studies reported that Gram's negative bacteria particular Escherichia coli represented 53 – 72 % of the causative agents of UTI in adult women (51, 52, and 53). According to other research, E. Coli is the most prevalent pathogen (75%–95%) for uncomplicated UTIs. It is followed by Proteus mirabilis, group B streptococci, Enterococcus faecalis, Klebsiella pneumoniae, and Staphylococcus saprophyticus. Furthermore, adjacent to blood-borne infections, Staphylococcus aureus-related UTIs are typically regarded as secondary infections (30).

Furthermore, In their lives, up to 60% of women get at least one symptomatic UTI. In the US, about 10% of women experience one or more bouts of symptomatic UTIs annually. Additionally, the majority of the 60 affected women (65%) in this study were between the ages of 17 and 30, indicating that this age range is more susceptible to UTIs. This is consistent with earlier studies by other researchers who found that the highest incidence of UTIs is seen among young, sexually active women between the ages of 18 and 24. Of these women, about 25% experience spontaneous symptom relief, and an equivalent proportion get an infection (54).

Antibiotic sensitivity reactions

Concerning antibiotic sensitivity reaction, the types and concentrations of current antibiotic discs which employed in the present study was according to the manufacturing company (Bioanalyse susceptibility discs, Turkey) as demonstrated in table number 3 and The bacterial isolates' antibiotic sensitivity test responses were in accordance with Kirby-Bauer's disc diffusion method (48).

Table (3): Standard Antibiotics Types and concentrations and their inhibition zones diameters (mm) in the present study.

Antibiotic	Symbol	Concentration	Resist	Intermediat	Sensitive
Ciprofloxacin	CIP	30 mcg	≤15	16-20	≥21
Azthromycin	AZM	15mcg	≤13	14-22	≥23

Gentamycin	HLG	120 mcg	≤12	13-14	≥15
Ceftazidim	CAZ	30 mcg	≤14	15-22	≥23
Amoxicillin	AX	10 mcg	≤13	14-16	≥17
Amikacin	AK	10 mcg	≤14	15-16	≥17

CIP= Ciprofloxacin, AZM= Azthromycin, HLG= Gentamycin, CAZ= Ceftazidim, AX= Amoxicillin, and AK= Amikacin.

Results of Antibiotic sensitivity tests

The antibiotic sensitivity test reactions were as the following:-

Most Gram's negative bacteria were sensitive to the following antibiotics: Ciprofloxacin, Amoxicillin, and Amikacin, and were resistant to the following antibiotics: Azthromycin, and Ceftazidim, on the other hand, Gram's positive bacteria had intermediate reactions to the following antibiotics: Ciprofloxacin, and Amikacin, as well as, Gram's positive bacteria were resistant to the following antibiotics: Azthromycin, Gentamycin, Ceftazidim, and Amoxicillin, as demonstrated in Table no. 4 and in Figure no. 8

Table 4: Antibiotics sensitivity patterns for bacterial isolates from Women with UTI. zone diameters (mm) in the present study.

Uropathogens	Susceptibility	CIP	AZM	HLG	CAZ	AX	AK
Gram's Negative Bacteria	Sensitive	40	-	17	-	28	20
	Intermediate resistance	-	-	-	-	-	-
	Resistant	-	8	-	8	-	-
Gram's Positive Bacteria	Sensitive	-	-	-	-	-	-
	Intermediate resistance	20	-	-	-	-	15
	Resistant	-	10	10	8	10	-

CIP= Ciprofloxacin, AZM= Azthromycin, HLG= Gentamycin, CAZ= Ceftazidim, AX= Amoxicillin, and AK= Amikacin.

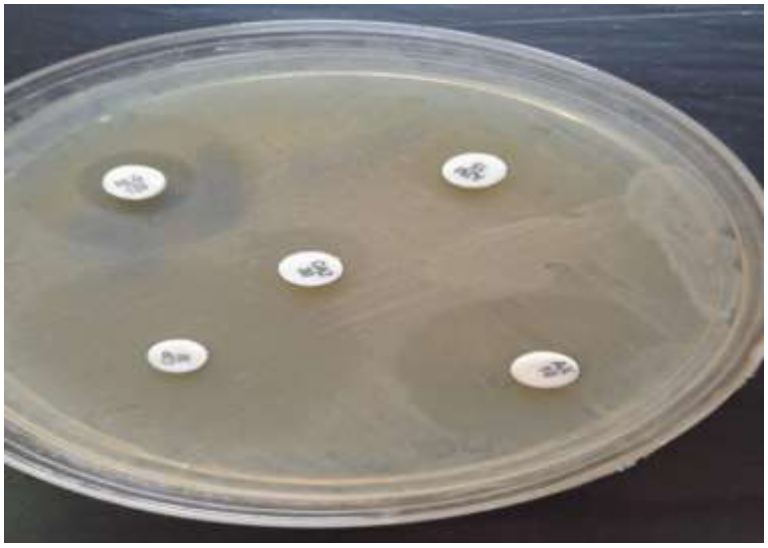

Figure number – 8 illustrates the results of the gram-negative bacterial isolates' antibiotic susceptibility test on Muller Hinton medium using Kirby-Bauer's disc diffusion method.

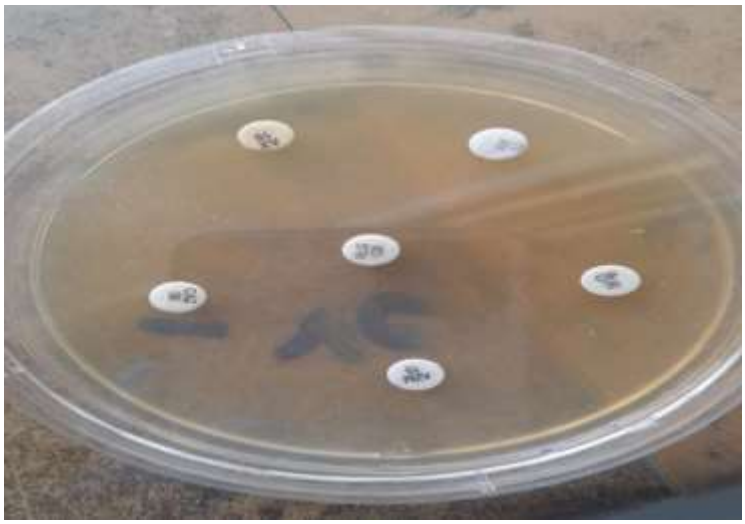

Figure number – 9 demonstrates antibiotic susceptibility test of the bacterial gram positive isolates on Muller Hinton medium according to (Kirby Bauer's disc diffusion method).

In the current study the most of bacterial isolates of the urine samples that isolated from the women with clinical signs of UTI were Gram's negative bacteria 38 (63.33%) table no. 3, that represented by *E .coli* strains as displayed on MacConkey agar plates in figure no 1, and this result was agree with the most of the researchers reported that about (75 to 95 %) of One type of bacterium that causes UTIs is called E. Coli; these bacteria are generally found in the intestines but can occasionally enter the urinary tract. Some less prevalent forms of bacteria (30, 54, 55) can cause UTIs. When germs get past the urinary tract's robust natural defenses, one or more of its structures can become infected, resulting in a urinary tract infection. Human urinary tract infections (UTI) are a major source of disease (20).

In addition to, in present study the intermediate common uropathogens in women with UTI were mixture of Gram's negative and Gram's positive bacteria 14 (23.33%) as in table no. 3, and the less common uropathogens were Gram's positive

bacteria 8 (13.33%) which had intermediate reactions against antibiotic used in antibiotic sensitivity test, andWhen local E. Coli strain resistance surpasses 20 percent, the 1999 guidelines for treating UTIs published by the Infectious Disease Society of America (IDSA) do not specify a particular antibiotic for empirical treatment.Physicians should also seek for information regarding local resistance rates, according to the IDSA (56). The findings of the test for antibiotic sensitivity in the present study of table no. 3, the best antibiotics should be used for the treatment protocol for the women with UTI are Ciprofloxacin, Amoxicillin, and Amikacin Figure no. 8 because the bacterial isolates displayed an obvious sensitivity reactions against these antibiotics which considered as a drugs of choice, these results were agree with other previous researches published that The first step in conventional UTI treatment is antimicrobial therapy; however, in order to minimize excessive antibiotic exposure and swiftly clear bacterial infections, alternative tactics and techniques are also necessary (57, 58).

Recurrent UTI sufferers might require more testing to determine which antibiotics are best for them in order to receive the best care and cure their infection. In order to help clinicians identify and start empirical antibiotic Additional guidelines were established in 2022 by the South Australian expert Advisory Group on Antibiotic Resistance (SAAGAR) for treatment of adult patients with suspected bacterial urinary tract infections (UTIs). Guidelines regarding asymptomatic bacteriuria, catheter-associated urinary tract infections, and recurring UTIs, and pyelonephritis (59). Women experiencing recurrent UTIs should have a complete assessment of their symptoms prior to beginning treatment.(60).

Despite the availability of readily available diagnostic tools, medications, and a greater understanding of the biology of urinary tract infections, they continue to rank among the most prevalent bacterial illnesses. Most of the time, the lower urinary tract's first line of defense will be successful in keeping bacteria from attaching and growing. But occasionally, and more frequently in particular risk groups, bacteria will settle down in the urinary system and produce an infection. Pyelonephritis is less frequently caused by bacteria that go to the upper urinary system. Many women who get recurrent UTIs are administered antibiotics frequently or for extended periods of time as a preventative measure. New treatment approaches are thus required due to the rapidly growing issue of bacterial resistance to antibiotics used in UTIs.

The bacterial uropathogens that cause UTIs in women at AlHaydaria and Al-Khairat Center Hospitals, together with their patterns of antibiotic susceptibility, were identified in the current study. Out of the sixty urine samples obtained from women who had clinical indications of urinary tract infections, Gram-negative bacteria were the most prevalent, followed by Gram-positive bacteria and mixed G-ve and G+ve bacteria.

4. Conclusion

In conclusions the higher number 39/60 (65%) of affected women with clinical signs of UTI were between (17–30) years old both in Al-Haydaria and Al-Khairat Center Hospitals. The predominant uropathogens in women with clinical signs of UTI were Gram's negative bacteria 38 (63.33%) followed by Mixed (G-ve and G+ve) bacteria 14 (23.33%) and the less common uropathogens were Gram's positive bacteria 8 (13.33%). Antibiotic sensitivity tests revealed that the most effective antibiotics against Gram's negative bacteria were Ciprofloxacin, Amoxicillin, and Amikacin, moreover, Gram's positive bacteria had intermediate resistance against Ciprofloxacin, and Amikacin so, these

antibiotics can be considered as drugs of choice for treatment of the clinical signs of UTI in women attended both Al-Haydaria and Al-Khairat Center Hospitals.

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