

Study of Some Factors Associated with Urinary Tract Infection Patients

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ABSTRACT

Urinary tract infection is one of the commonest infections to affect humans. Uncomplicated infections occur most commonly in otherwise healthy women when uropathogenic bacteria, usually *Escherichia coli*, ascend from the perineum into the bladder and overcome host innate immunity. Complicated infections occur in patients with an anatomical or functional abnormality of the urinary tract. The diagnosis is made on the basis of symptoms and diagnostic precision is improved by urinalysis. Urine culture is important with severe, recurrent or complicated infection and when the diagnosis is unclear, for example, in children and the elderly. Most women with symptoms that resolve quickly do not require further investigation but in children, men and patients with recurrent or severe infection, imaging of the renal tract, functional testing and cystoscopy should be considered to exclude an underlying abnormality. Empirical antibiotic treatment started on the basis of symptoms and directed by urinalysis is suitable for uncomplicated cystitis but should be altered based on culture results for more severe infections. Three days' antibiotic treatment is usually sufficient for uncomplicated cystitis in women. Long-term or post-coital antibiotics are effective treatments for patients with recurrent infection in whom non-antibiotic strategies have failed

1-1 -INTRODUCTION:

The urinary tract is comprised of the kidneys, ureters, bladder, and urethra. Urinary Tract Infection (UTI) is a bacterial infection affecting urinary tract. When bacteria from the rectal area enter the urinary tract via the urethra to the bladder and multiply in the urine, an infection occurs. In many cases bacteria first travel to the urethra.(1). When bacteria multiply an infection can occur. An infection limited to the urethra is called urethritis. If bacteria move to the bladder and multiply, a bladder infection called cystitis. If the infection is not treated promptly, bacteria may then travel further up the ureters to multiply and infect the kidneys, called pyelonephritis(2). Urinary tract infections are infections of the urethra, bladder, ureters, or the kidneys, which comprise the urinary tract. *E. coli* bacteria cause the majority of UTIs, but many other bacteria, fungi, and parasites may also cause UTIs(3). Females have a higher risk for UTIs than most males, probably because of their anatomy, other risk factors for UTIs include any condition that may impede urine flow (e.g., enlarged prostate, congenital urinary tract abnormalities, and inflammation)(4). Patients with catheters or those who undergo urinary surgery and men with enlarged prostates are at higher risk for UTIs(5). Symptoms and signs of UTI vary somewhat depending on sex, age, and the area of the urinary tract that is infected; some unique symptoms develop depending on the infecting agent(6).

1-2 - The aims of this study:

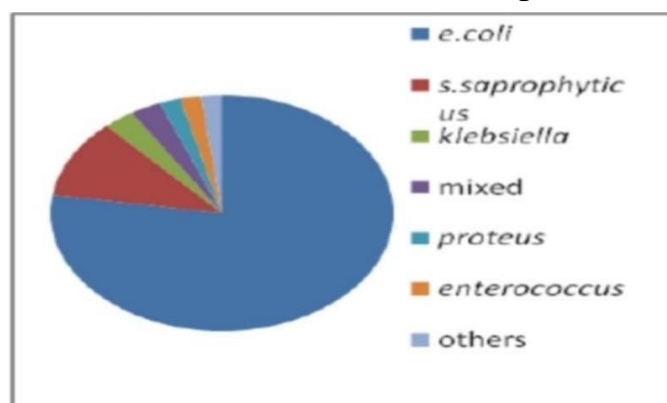
An attempting was made to find a relationship between urinary tract infections for patients in Anbar governorate with several accompanying factors (such as age, gender, family history of infection, in addition to educational attainment), as well as isolating bacteria from the studied samples and observing their response to common antibiotics in the treatment of UTI.

1-3 - Discovery of urinary tract infection

Urinary tract infections (UTIs) are some of the most common bacterial infections, affecting 150 million people each year worldwide(20). UTIs are diagnosed usually by isolating and identifying the urinary pathogen from the patient there are some home tests available for presumptive diagnosis. There are home remedies for UTI, but most may, at best, help reduce the risk or discomfort of UTIs. They are not considered cures for the disease. There can be many complications of urinary tract infections, including dehydration, sepsis, kidney failure, and death. If treated early and adequately, the prognosis is good for most patients with a UTI. Although there is no vaccine available for UTIs, there are many ways a person may reduce the chance of getting a UTI. A urinary tract infection, or UTI, is an infection that can happen anywhere along the urinary tract(6).

According to the CDC, UTIS are the most common bacterial infection requiring medical care, resulting in 8.6 million ambulatory care visits in 2007, 23%

of which occurred in the ED (21). Over 10.8 million patients in the United States visited the ED for the treatment of UTIS between 2006 and 2009 and 1.8 million patients (16.7%) were admitted to acute care hospital (22). The economic burden



of using the ED for the treatment of UTIS is estimated at \$2 billion annually. In addition, UTIS rank as the No. 1 infection that leads to an antibiotic prescription after a physician's visit.(23)

The most common UTI cause in all age groups is E. coli (65% to 75%). Other bacteria agents include Klebsiella species, usually Klebsiella pneumoniae (23%), Proteus mirabilis (7%), other Enterobacteriaceae, Enterococcus species, Pseudomonas aeruginosa, staphylococcus saprophyticus (1% to 4%) .(24)

1-4 - Causes of UTI:

Normally urine is sterile. It is usually free of bacteria, viruses and fungi but does contain fluids, salts and waste products. An infection occurs when tiny organisms, usually bacteria from the digestive tract, cling to the opening of the urethra and begin to multiply. Most infections arise from one type of bacteria, E.coli which normally lies in the colon. The organisms most commonly responsible for catheter-associated UTIs are E.coli, Proteus mirabilis, P.aeruginosa, and Streptococcus faecalis, Staphylococcus aureus, Klebsiella pneumoniae, Mycobacterium tuberculosis, Actinomyces, Nocardia, Candida etc can cause UTI. In addition Mycoplasma and Chlamydia may be associated with sexually transmitted UTI(7) .

Figure 1. Diagram showing contribution of various microbes for causing the UTI: E. coli 79%, S. Saprophyticus 11%, Klebsiella 3%, Mixed 3%, Proteus 2%, Enterococcus 2%, others (29%).

1-5 - Epidemiology of urinary tract infections:

Urinary tract infections have different names, depending on what part of the urinary tract is infected(8).

- ☐ Bladder -- an infection in the bladder is also called cystitis or a bladder infection
- ☐ Kidneys -- an infection of one or both kidneys is called pyelonephritis or a kidney infection
- ☐ Urethras -- the tubes that take urine from each kidney to the bladder are only rarely the site of infection
- ☐ Urethra -- an infection of the tube that empties urine from the bladder to the outside is called urethritis.

Urine parameters proteinuria and haematuria in isolation were not found to be associated with mortality unlike other studies which reported proteinuria and haematuria as isolated indicators of increased in-hospital morbidity and mortality[9]. A cute kidney injury (AKI) results from abrupt loss of renal function[6].

1-6- Definition and symptoms:

Stinging or burning when passing urine.

- Passing very small amounts of urine.
- Feeling the need or 'urge' to pass urine frequently.
- Feeling that the bladder is still full after passing urine.
- Smelly, cloudy, dark or bloody urine.
- Pain low down in the abdomen or in the lower back or sides.
- Feeling unwell with nausea and fever.
- In the elderly it can cause confusion.
- Flank or back pain (kidney infection)

Fever, chills (usually with kidney infection. (18) (19)

Urinary tract infections (UTIs) are caused by a wide range of pathogens, including Gram-negative and Gram-positive bacteria, as well as fungi. Uncomplicated UTIs typically affect women, children and elderly patients who are otherwise healthy. Complicated UTIs are usually associated with indwelling catheters, urinary tract abnormalities, immunosuppression or exposure to antibiotics. The most common causative agent for both uncomplicated and complicated UTIs is uropathogenic *Escherichia coli* (UPEC). For uncomplicated UTIs, other causative agents are (in order of prevalence) *Klebsiella pneumoniae*, *Staphylococcus saprophyticus*, *Enterococcus faecalis*, group B *Streptococcus* (GBS), *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Candida* spp. For complicated UTIs, the other causative agents are (in order of prevalence) *Enterococcus* spp., *K. pneumoniae*, *Candida* spp., *S. aureus*, *P. mirabilis*, *P. aeruginosa*. [12]

1-7 - Adherence and colonization:

Adherence is a key event initiating each step in UTI pathogenesis. A UTI typically starts with periurethral contamination by a uropathogen residing in the gut, followed by colonization of the urethra and subsequent migration of the pathogen to the bladder, an event that requires appendages such as flagella and pili (FIG. 1). In the bladder, the consequences of complex host–pathogen interactions ultimately determine whether uropathogens are successful in colonization or eliminated[12].

1-8- Pathogenesis of urinary tract infections:

A |- Uncomplicated urinary tract infections (UTIs) begin when uropathogens that

reside in the gut contaminate the periurethral area:-

(step 1) are able to colonize the urethra. Subsequent migration to the bladder,

(step 2) expression of pili and adhesins results in colonization and invasion of the superficial umbrella cells,

(step 3) Host inflammatory responses, including neutrophil infiltration,

(step 4) begin to clear extracellular bacteria. Some bacteria evade the immune system, either through host cell invasion or through morphological changes that result in resistance to neutrophils, and these bacteria undergo multiplication,

(step 5) and biofilm formation,

(step 6). These bacteria produce toxins and proteases that induce host cell damage,

(step 7) releasing essential nutrients that promote bacterial survival and ascension to the kidneys,

(step 8) Kidney colonization results in bacterial toxin production and host tissue damage,

(step 9) If left untreated, UTIs can ultimately progress to bacteremia if the pathogen crosses the tubular epithelial barrier in the kidneys,

B |Uropathogens that cause complicated UTIs follow the same initial steps as those described for uncomplicated infections, including periurethral colonization

(step 1) progression to the urethra and migration to the bladder,

(step 2) However, in order for the pathogens to cause infection, the bladder must be compromised. The most common cause of a compromised bladder is catheterization. Owing to the robust immune response induced by catheterization,

(step 3) fibrinogen accumulates on the catheter, providing an ideal environment for the attachment of uropathogens that express fibrinogen-binding proteins. Infection induces neutrophil infiltration,

(step 4) but after their initial attachment to the fibrinogen-coated catheters, the bacteria multiply,

(step 5), form biofilms,

(step 6) promote epithelial damage and can seed infection of the kidneys,

(step 7) where toxin production induces tissue damage,

(step 8) If left untreated, uropathogens that cause complicated UTIs can also progress to bacteremia by crossing the tubular epithelial cell barrier .

1-8-1-Biofilm formation:

Extracellular DNA (eDNA), exopolysaccharides called extracellular polymeric substances, pili, flagella and other adhesive fibres create a scaffold to form a multicellular bacterial community that is protected from immune responses, antimicrobial agents and other stresses. The antimicrobial recalcitrance of uropathogens increases on biofilm maturation, as the biofilm provides a physical barrier to antibiotic entry. Therefore, understanding species-specific biofilm formation and dispersal mechanisms is crucial for the development of novel therapies that prevent colonization, such as biofilm inhibitors, anti-adhesive molecules and molecules that induce bacterial dispersion[13]

1-8-2 Uropathogenic *Escherichia coli* :

Many uropathogens initiate a UTI using pili that mediate adhesion to host and environmental surfaces, facilitate invasion into the host tissues and promote interbacterial interactions to form biofilms. For example, numerous Gram-negative pathogenic bacteria — including *E. coli* In the bladder, uropathogenic *Escherichia coli* (UPEC) expression of type 1 pili is essential for colonization, invasion and persistence. The type 1 pilus adhesion . Uropathogenic *Escherichia coli* (UPEC) forms biofilm-like intracellular bacterial communities that protect their members from neutrophils, antibiotics and other stresses[14]

1-8-3 *Proteus mirabilis* :

Proteus mirabilis produces urease, which hydrolyses urea to carbon dioxide and ammonia. This increases the urine pH and generates calcium crystals and magnesium ammonium phosphate precipitates, which are incorporated into polysaccharide capsules, forming crystalline biofilms on the catheter. The phosphotransferase regulator of swarming behavior, these crystals, allowing the formation of a crystalline biofilm, which protects the community from the host immune system and from antibiotics . Finally, production of the bacterial toxins haemolysin and *Proteus* toxic agglutinin is important for tissue destruction and bacterial dissemination to the kidneys. *P. mirabilis* produce two toxins, haemolysin and *Proteus* toxic agglutinin which are implicated in tissue damage and dissemination to the kidneys, initiating acute pyelonephritis

1-8-4 *Klebsiella pneumoniae* :

Similarly to UPEC, *K. pneumoniae* uses type 1 pili for biofilm formation and bladder colonization. Moreover, *K. pneumoniae* has a weaker adherence

to the bladder than UPEC, resulting in significantly lower *K. pneumoniae* titers in the mouse bladder and fewer than are seen for UPEC. Despite the relatively poor adhesive properties of *K. pneumoniae* in the urinary tract, it remains an important virulence factor for *K. pneumoniae* during colonization, biofilm formation and persistence in UTIs. [17]

1-8-5- Pseudomonas aeruginosa:

Pseudomonas aeruginosa has the ability to form biofilms on catheters and damaged bladder tissue, through several mechanisms, including quorum sensing which induces the production of eDNA, rhamnolipids, lectins, elastases and toxins.[16]

1-8-6- Enterococci :

Enterococci encode several adhesion factors, including the collagen adhesion, enterococcal surface protein, enterococcal polysaccharide antigen, and endocarditis- and biofilm-associated. Of these, pili contribute to UTIs and are required for persistence during infection, resulting in a robust inflammatory response, exfoliation, edema, and mucosal lesions of the uroepithelium and kidneys, *E. faecalis* attachment and biofilm formation, which promotes *E. faecalis* persistence in the bladder and further dissemination to the kidneys.[15]

The caregiver should obtain a detailed history from the patient, and if a UTI is suspected, a urine sample is usually obtained. The best sample is a midstream sample of urine placed in a sterile cup because it.

Usually contains only the pathogenic organisms instead of the transient organisms that may be washed from adjacent surfaces when the urine stream begins.

Male patients with foreskin should retract the foreskin before providing a midstream urine sample. In some patients who cannot provide a midstream sample, a sample can be obtained by a catheter. The urine sample is then sent for urinalysis. Patients with a "discharge," or possibility of having an STD, usually will have the discharge tested for STD organisms (for example, *Neisseria* and *Chlamydia*)(19)

Table(1-1) the common microorganisms which are associated with UTI

Group	Organisms	Reference
gram negative bacteria	<i>E.coli.</i>	Jawetz et al., 1998.
	<i>Proteus mirabilis</i>	Mobley and Belas,
	<i>Klebsiella spp</i>	1995 Mims et al, 1987.
	<i>Enterobacter spp.</i>	Glauser, 1986.
	<i>Serratia marsecens</i>	Mims et al., 1987.
	<i>Saimoneila spp</i>	Mims et al., 1987.
	<i>Pseudomonas aeruginosa</i>	Maskell, 1988.
	<i>Haemophilus influenzae</i>	Navarro et al., 1994.
	<i>Brucella spp.</i>	
	<i>Nisseria gonorrhoea</i>	



		Terai et al, 1994. Navarro et al., 1994
Gram positive bacteria	Staphylococcus saprophyticus Staphylococcus epidermidis Staphylococcus aureus Staphylococcus hemolyticus Staphylococcus hyicus Streptococcus faecalis S. milleri. Enterococci. Corynebacterium spp	Glauser, 1986. Sobel et al., 1993. Stamm, 1998. Glauser, 1986. Jawetz et al., 1998. Maskell, 1988. Navarro et al., 1994. Navarro et al., 1994. Terai et al, 1994
Others	Candida spp. Chlamydia trachomatis Mycoplasma hominis Cryptococcus neoformans HIV. Herpes simplex virus	Navarro et al, 1994. Mobley and Belas, 1995 Mims et al, 1987. Tolkoff-Rubin et al. 2004 Glauser, 1986. Mims et al 1987

1-9 - Treatment of urinary tract infections :

Treatment for a UTI should be designed for each patient individually and is usually based on the patient's underlying medical conditions, what pathogen(s) are causing the infection, and the susceptibility of the pathogen(s) to treatments. Patients who are very ill usually require intravenous (IV) antibiotics and admission to a hospital; they usually have a kidney infection (pyelonephritis) that may be spreading to the bloodstream. Other people may have a milder infection (cystitis) and may get well quickly with oral antibiotics. Still others may have a UTI caused by pathogens that cause STDs and may require more than a single oral antibiotic[10]. Patients suffering from a symptomatic UTI are commonly treated with antibiotics; these treatments can result in long-term alteration of the normal micro-biota of the vagina and gastrointestinal tract and in the development of multidrug-resistant microorganisms[11]

Materials and Methods

Materials and methods:

2.1- Materials & Equipments :

2.1.1 Equipments

<i>Equipments</i>	<i>Company (country)</i>
Autoclave	Gallenkamp(england)

Balance	Ohans(France)
Compound light microscope	Olympus (Japan)
Hot Plat with magnetic stirrer	Gallenkamp(england)
Incubator	Gallenkamp(england)
Micropipette	Witeg(Germany)
Millipore Filter	Millipore and Whatman(England)
Oven	Memert(Germeny)
pH-Meter	Meter-GmpH Tdedo(U.K)
Portable centrifuge	Hermle labortechnik(Germany)
Water bath	GFL (England)
Petri dish	Witeg(Germany)
Conical flask	Witeg(Germany)
MetaLoop	Himedia laboratories (India)
Graduated cylinder	Witeg(Germany)
Benzen burner	Himedia laboratories (India)
Specimen container	Witeg(Germany)
Washing bottle	Witeg(Germany)
Spatula	Himedia laboratories (India)

2.1.2 The Media

Medium	Company(country)
Blood base agar	Mast-dignostic (England)
MacConkey agar (Mac agar)	Oxiod(England)
nutrient agar (N.A)	Oxiod(England)
Muller Hinton agar	Biokit S.A (Spain)

2.1.3 - Antibiotic disks

Name of Antibiotics (concentration)	Symbol	Company

Doxycycline (10 µg)	DO- 10 µg	Bioanalyse (Turkey)
Azithromycin (15 µg)	AZM-15 µ	Bioanalyse (Turkey)
Norfloxacin (30 µg)	NOR-30 µ	Bioanalyse (Turkey)
Imipenem (10 mcg)	IMP-10 mc	Bioanalyse (Turkey)
Rifampi (5 mcg)	RA-5 mcg	Bioanalyse (Turkey)

2.1.4 - Chemicals and stains :

Chemicals	Company(country)
Crystal violet	BDH(England)
Safanin	BDH(England)
Crystal violet	BDH(England)
Ethanol	Riedel-De Haen (Germany)
Methanol	BDH(England)

2.2 - METHODS

2.2.1 - Media preparation

1- Nutrient agar, nutrient broth, MacConkey agar, and Muller Hinton agar.

These media were prepared in petri-dishes as recommended by manufacturing companies, autoclaved at 121°C for 15 minutes.

2- Blood agar.

It was prepared by autoclaving blood agar base at 121°C for 15 minutes, cooled to 50°C, the blood was added to give final concentration of 5%, mixed well and poured in petri-dishes.

2.2.2 - Source of Specimens:

This study was conducted in the Urology Department in AL-Fallujah Teaching Hospital , also from some private laboratories , as a part of research programs for primary studies in College of Applied Science, University of AL-Fallujah. The number of the patients was 80 and the sample collection process took place from November 2021 until July 2022. All have urolithiasis including 29 males and 51 females. Patients aged between 9 month to 60 years.

The control group composed of 34 subjects who were looked healthy and had

comparable criteria to the patients and composed of 12 males and 22 females.

2.2.3. Collection of urine samples

Ten ml of clean and mid-stream of urine samples were collected in sterile containers (Himedia-India) from two groups of outpatients who visited private clinics in Al-Anbar city. All containers were labeled according to gender and age of each patient. Immediately, the urine samples were processed for bacterial cultivation [26].

2.2.4- Laboratory Methods

2.2.4.1. Bacterial isolation:

Loopful of undiluted urine samples were spread on blood agar and MacConkey agar plates. Plates were incubated overnight at 37°C, then single colonies were observed. Media were prepared and sterilized according to the manufacturer's instruction. The prepared media used for isolation, determination of the viable count, identification and susceptibility testing were carried out after being solidified. Then the colonies which showed positive reaction were transferred to new MacConkey agar plate for further purification by dilution streaking to obtain single isolated colonies, then used for further diagnosis. [25].

2.2.4.1.1- Morphological Examination

The colony characteristics on solid medium and cellular morphology of culture isolate after Gram's staining were examined at each step of incubation according to the methods of Collins et al. [15b]

2.2.4.1.2 - Gram Staining

Microscopically of isolates showed Gram-positive and Gram-negative, coccid and rod shaped (16b).

2.2.4.1.3. Preparation of the Culture Medium for Antibiotic Sensitivity Testing :

Antibiotic sensitivity testing of all isolates was performed on Mueller-Hinton medium by the Kirby-Bauer method (1996) following the definition of the National Committee of Clinical Laboratory Standard (NCCLS, 1999). The medium was allowed to cool at 45°C and poured into Petri dishes to about 4 mm thickness of medium. The solidified plates were incubated at 37°C for 15 – 30 minutes to let the excess moisture to evaporate (Fisher scientific, USA) [25].

2.2.4.1.4. Sensitivity test to antibiotics

The plates were inoculated by dipping a sterile swab into the inoculum, the excess inoculum was removed by pressing and rotating the swab firmly against the side wall of the tube above the level of fluid, then the swab was rubbed all over the surface of the medium, rotating the plate 3 times at an angle of 60 degree after each application and finally the swab passed around the edge of agar surface. The plate was left to dry at room temperature with the lid closed for few minutes. After 15 minutes of inoculation, the antibiotic discs were applied and the plates were inverted for incubation to avoid accumulation of moisture on the agar surface [27]. Maximum 5 antibiotic discs were selected and placed onto each plate using flamed forceps for application of the discs on the plate and each disc pressed down gently to ensure even contact with the medium. After overnight incubation at 37°C the diameter of

each zone including the diameter of zone inhibition was measured and recorded in mm and compared with the standard inhibition zone. For motile organisms, e.g. *Proteus* spp. The swarming haze was ignored and zones were measured at the point where growth was obviously inhibited [27].

2.2.5. Maintenance of bacterial isolates

Maintenance of bacterial isolates was performed according to (17b) as following:

1- Short term storage.

Bacterial isolates were maintained for short periods of (2 – 3 weeks) on MacConkey agar plate; the plates were tightly wrapped in parafilm and stored at 4°C.

2- Medium –term storage.

Bacterial isolates were maintained in stab culture for period of few months, such cultures were prepared in small screw-cup bottles containing 2-3 ml of nutrient agar media and stored at 4°C .

2.2.6. Statistical Analysis

Statistical analyses in the present study were done by using Microsoft Office Excel 2007, SPSS version 26 (Statistical Package for Social Sciences). The programs used were F-test, T-test, and Chi-square [28].

Results and dissection

Results and dissection:

3.1- Collection of urine samples & Isolation of bacterial UTI:

eighty midstream urine samples were collected from patients suffering from symptoms referred as urinary tract infection. Samples were collected from patients of the Urology Department in AL-Fallujah Teaching Hospital and urology clinic, during period from November 2021 until July 2022.



The results of observing bacterial isolates by the macroscopic characteristics of bacterial colonies were based on colony morphology which included colony shape, colony color, colony edge, and elevation of bacterial colonies that had been cultured on nutrient agar plates. Observation of the microscopic characteristics of bacterial cells includes the shape and size of cells, observation of the results of gram staining, and observations of endospores staining results. Based on observations of microscopic characteristics. Out of eighty urine samples, 46 (57.5%) samples gave bacterial growth on MacConkey agar and blood agar. Determination of bacterial

isolates was carried out based on the macroscopic characteristics of colonies, microscopic cells.

In these study the laboratory diagnosis of UTI is based on microscopic examination and bacteriological culture of urine samples, and microscopic examination depends on the number of Pus Cells in the microscopic field under great force. Research indicates that there is a close relationship between the presence of Bacteria and the appearance of pus cells in the urine sample at a rate of (85%) (39), and accordingly the auditors were classified into infected and uninfected

These results are similar to results reported by Sebahi (2003) , who found that the percentages of positive cultures of urine samples on MacConkey and Blood agar were 66% and 64.6% respectively, while higher percentages were reported by [31] who reported percentages of positive cultures of urine samples on these two media equivalent to 93.7%, 89%, 84% respectively. On the other hand lower percentages were reported by [32] who found that the positive cultures of urine samples on the above mentioned media were 49.4%, 27% respectively. The reason behind differences in the observed percentages may Be due to difference in size, number, site of collection, season, and Medication especially exposure to antibiotics.

3.2- According on sex

The results showed, By eighty individuals, in which the number of male specimens was (29) and females (51), where the number of infection cases among females was (29: 51) (36%), and the number of infected males was (17: 29) (17 %) samples gave Bacterial growth on MacConkey agar and blood agar, Results in (table 3-1) show prevalence of bacteria in both sexes, (57.5 %) isolates out of (12.5 %) were identified in male samples (87.5 %), while in female samples (7)female/male ratio (7-1) .

Table (3.1) Frequency of UTI in both sexes

sex	infection	normal	Total
male	17 21%	12 15%	29 36%
femal	29 36 %	22 28 %	51 64%
Total	46 57.5%	34 43%	80 100%

The differences were significant ($P > 0.05$).

In these study females are more likely to contract the disease than males (Table 3-1) and the reason for this may be due to the proximity of the urinary tract opening to the anus in females, which facilitates the ascending infection more than males (40) . Similar result was obtained by [33]who found that The isolation percentage of bacteria from UTI cases was 38 %, and the female/Male ratio was 1.72/1 of UPEC isolates.

3.3- According on genetic symbols :

The results of this current study showed that the number of infected fathers was (47:80) (59%), while the number of healthy fathers was (33:80) (41%) .

It is also showed that the number of infected mother was (37:80) (46%), while

the number of healthy mothers was (43: 80) (54%) (Table 3.2)

Table (3.2) relationship between genetic and infection

Genetic	Infection	Normal	Total
Father	47 59%	33 41%	80 100%
Mother	37 46%	43 54%	80 100%

Differences as significant ($P > 0.05$)

3.4 - According on age :

It was divided into (7) age groups, as shown in (Table 3.3), where the number of infection in the first group was (0: 2) and at a rate of (0%), and the number of infection in the second group was (8: 14) and at a rate of (10%) and As for the number of infection in the third group (4:6), a rate of (5%) , while the number of infection in the fourth group was (20:42) and at a rate of (25%) and the number of infection in the fifth group was (6:7) and at a rate of (8%) and the number of infection in the sixth group was (3: 4) At a rate of (4%) and the number of patients in the last group was (4:5) and at a rate of (5%) and that the differences between the age groups.

Table (3.3) relationship between age and infection

Age	Infection	Normal	Total
1-12 month	0 0 %	2 3%	2 3%
1-10 year	8 10%	6 8%	14 18%
11-20	4 5%	2 3%	6 8%
21-30 year	20 25%	22 28%	42 53%
31-40 year	6 8%	1 2%	7 9%
41-50 year	3 4 %	1 1 %	4 5%
51-60 year	4 5%	1 1%	5 6%
Total	45 56%	35 44%	80 100%

3.5 Academic achievement

Result in (Table 3.4) show that the auditors were divided into (3) categories. The first category includes learners who hold an intermediate certificate or above, and the second category includes those who can read and write, and the third category includes the illiterate. The number of infection for the three categories is respectively

(21:45) and (16:18) and (9:17), and the infection rates were (26)%, (20%) and (11%).

As for the effect of the parents' health status related to the same disease on the extent of the individual's disease (Table 3.2), this can be attributed to health conditions and some of the health habits followed, and consequently, the similarity in the extent of exposure to the factors causing the disease (37) ,The two researchers do not believe that there are genes related to the disease that are passed on from parents to children. As for the effect of age on the incidence of the disease (Table 3.3), the results of the current study showed the existence of non-significant differences, and this does not agree with (37), who indicated that age has a relationship with the incidence of the disease. The researchers believe that the reason for the difference in the results of this study with the results of previous studies with regard to the disease may be due to the small size of the sample.

Table (3.4) relationship between education and infection

Education	infection	Normal	Total
High education	21 26%	24 30%	45 56%
Middle Education	16 20 %	2 3%	18 23%
Non education	9 11%	8 10%	17 21%
Total	46 58%	34 43%	80 100%

As for the effect of academic achievement on the disease (Figure 3.4), it was Previous studies (41) indicated that the cultural level had a significant effect on the incidence of the disease, while the differences were not significant in our current study, and the researchers believe that the reason for this may be due to the success of the media campaign . In which the departments of the Anbar Governorate Health Directorate have subscribed regarding health awareness and health practices in general

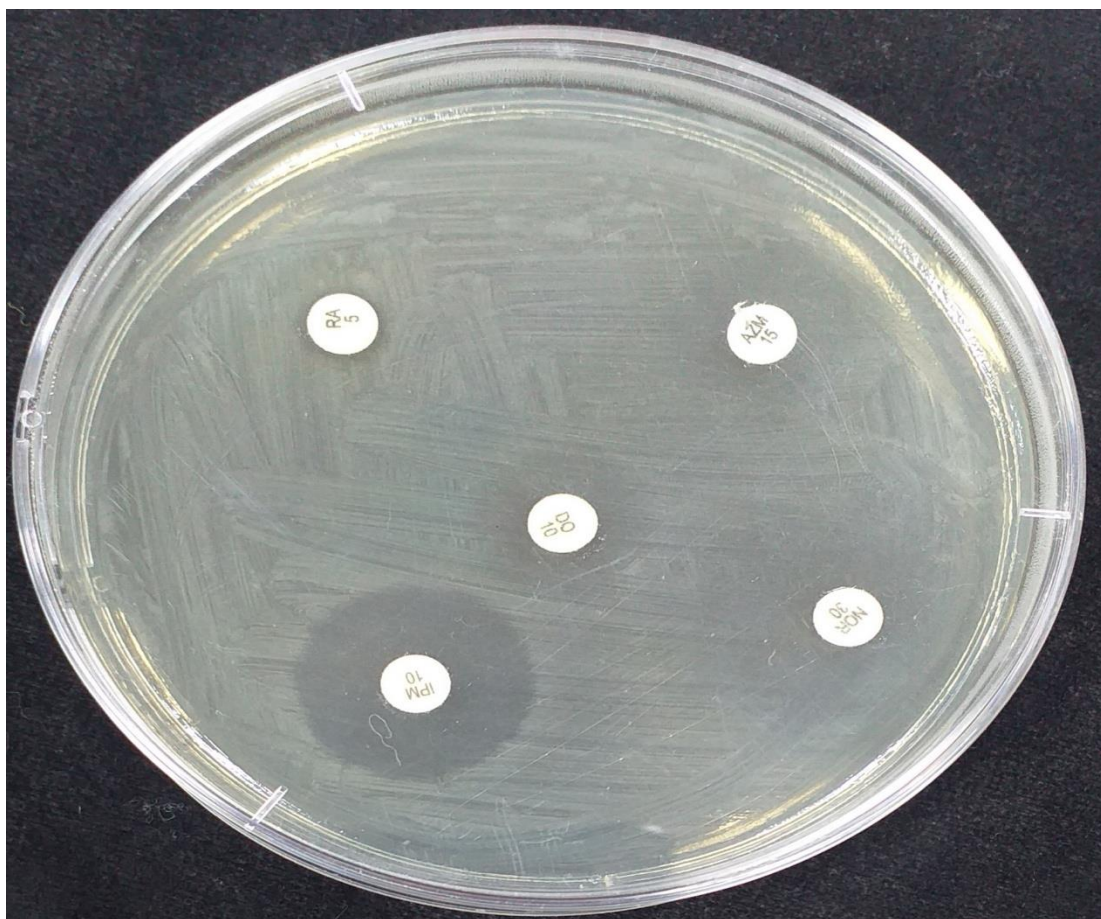
3.6 Antibiotic sensitivity

eighty bacterial isolates were screened for their resistance profiles to five antibiotics representing different groups, depending upon their mode of action. Results shown in table (3–5) indicate that variable resistance profiles among isolates against antibiotic were noticed and showed the evolution of multiplicity patterns , Several previous studies have indicated that all cultures demonstrated resistance to more than one drug organisms were highly resistant to the commonly used antibiotics. The(35) study recorded a higher prevalence of culture-positive UTI in pregnancy than all the studies in Uganda. Empirical treatment of UTI should be minimized as sensitivity varies for each organism, for each drug and over time

Table (3.5) Antibiotic diameter sensitivity results of the isolated bacteria

Bomber of sample	Rifampin 5 mcg	Azithromycin 15 µg	Norfloxacin 30 µg	Imipenem 10 mcg	Doxycycline 10 µg
1	0 mm	0 mm	0 mm	0 mm	8 mm
2	12 mm	20 mm	30 mm	28 mm	17 mm
3	0 mm	15 mm	24 mm	22 mm	14 mm
4	0 mm	25 mm	16 mm	24 mm	10 mm
5	14 mm	21 mm	30 mm	26 mm	12 mm
6	28mm	8 mm	15 mm	23 mm	16 mm
7	0 mm	0 mm	0 mm	0 mm	0 mm

The recorded percentage of inhibition zone of bacterial isolates to tested antibiotics (table 3-5), indicate that bacterial isolates were 29% resistant to imipenem, Norfloxacin and azithromycin, while (57%) were resistant to rifampin as (Figure 3-1). On the other hand (0%) were no resistant to Doxycycline. Similar results were reported by Al-Fahdawi (2001), and Al-Alosi (2004), who reported that no of his bacterial isolates from UTI patients were sensitive to ampicillin, Abd-alsaCar (2004) reported resistance percentage (95%) of bacterial isolates to ampicillin. Also the study of (36) showed to the Resistance to (β -lactam / β -lactamase inhibitor combination) may be due to over production of β -lactamase by



Figure(3-1)The Antibiotic test patterns diameters

Conclusions & RECOMMENDATIONS

Conclusions :

- 1- Causative agent of Bacterial UTI, has incidence rate was higher in females than males.
- 2- The bacterial isolates has variable response to five antibiotics representing different groups Rifampin, Azithromycin, Norfloxacin, Imipenem and Doxycyclin.
- 3- People who have a family history of urinary tract infections are more likely (1.48) times than those who do not have a family history.
- 4- There is a correlation between family history and an increase in the incidence rate, which indicates the influence of the genetic factor
- 5- There is a relationship between the incidence of UTI, gender and family history.

RECOMMENDATIONS :

1-Further studies to investigate the possible involvement of family history in the increase in injuries in offspring and the possibility of a genetic factor behind this increase.

2- Increasing the sample size and taking the random factor in the study, especially observing the effect of the level of academic achievement and age on the injury.

3- Further research is required on the multiplicity of antibiotics resistance, to investigate the evolution of multiple antibiotics resistance of uropathogen.

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APPENDIX :

Risk Estimate			
	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for FamilyHis (N / Y)	3.750	1.133	12.412
For cohort sex = F	1.458	1.092	1.947
For cohort sex = M	.389	.151	1.000
N of Valid Cases	80		