# Prevalence and antibiotic susceptibility of bacteria isolated from patients with UTIs in Karbala

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## Abstract

**Objective:** The aim of this study was to determine if UTI is a widespread problem among patients in Karbala district and to assess its relation with some possible risk factors such as age. The sensitivity of the isolated organisms to various antibiotics was also studied.

**Subjects:**  Three hundred patients with urinary tract infections(UTI)  202 ( 67.33% ) females and 98 ( 32.66%)males were studied at Al-Hussien Hospital from 1 March to 20 October 2008 .Their ages ranged from 1-60 years  .

**Results:**  Among 300 cases123 cases revealed bacterial  isolates .Those were *E.coli* 48(39.02%  )  , *Proteus mirabilis* 20,( 16.26%  )*Ps.euroginosa* 10,( 8.13%  ) *Enterobacter* 8(6.50%  ),*Klebsiella* 1(0.81%  ) , *Staphylococcus aureus* 31,( 25.20% )*Streptococcus* 5(4.06% ). The rate infection of female was higher than that of males (30.66 and 23.33% respectively).The highest rate of infection was in age 41-60 years (54%).The sensitivity of 123 isolates against 14 antibiotics exhibited that.

**Conclusions:** Screening urine samples is a necessary step in the laboratory diagnosis of UTI.  The sensitivity and resistance pattern is helpful in selecting drugs for better empirical response in the treatment of UTI.

**مدى انتشار ودراسة حساسية البكتريا المعزولة من المرضى في مدينة كربلاء**
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## الخلاصة

**الهدف من الدراسة:** تحديد خمج السبل البولية بين المرضى في مدينة كربلاء وعلاقة ذلك بالفئات العمرية فضلا عن دراسة حساسية العزلات البكتيريةنحو المضادات الحيوية .

**العينات:** أجريت هذه الدراسة للفترة من 1 آذار ولغاية 20 تشرين الاول 2008 للتحري عن انتشار الاخماج البكتيرية بين المرضى  الذين يعانون من أخماج السبل البولية في مستشفى الحسين (ع) في كربلاء .شملت هذه الدراسة 300 مريضا من  كلا الجنسين(202)اناث و (98) ذكوروباعمار تراوحت(1-60) سنة.حيث كانت العزلات البكتيرية:   *E.coli* 48(39.02%  ) , *Proteus mirabilis* 20,( 16.26% )*Ps.euroginosa* 10,( 8.13%  ) *Enterobacter* 8(6.50%  ),*Klebsiella* 1(0.81%  ) , *Staphylococcus aureus* 31,( 25.20% )*Streptococcus* 5(4.06% ).

وكانت نسبة الخمج في الاناث أعلى مما هي في الذكور (67.33%,32.66%) على التوالي كما أظهرت الفئة العمرية 41-60 أعلى نسبة للخمج والتي بلغت 54%. ودرست حساسية (123) عزلة تجاه (14) نوع من المضادات الحيوية وأظهرت النتائج تباينا واضحا في  حساسية ومقاومة هذه العزلات المحلية للمضادات الحيوية والتي تساعد في اختيار المضادات و أفضل استجابة في معالجة خمج السيل البولية .

## Introduction

Urinary tract is one of the most common sites of bacterial infection, particularly in females; 20-30% of women have recurrent urinary tract infections (UTI) at some time in their life. UTIs in men are less common and primarily occur after 50 years of age. Although the majority of infections are acute and short-lived, they contribute to a significant amount of morbidity in the population. Severe infections result in a loss of renal function and serious long term sequelae. In females, a distinction is made between cystitis, urethritis and vaginitis, but the genitourinary tract is a continuum and the symptoms often overlap[ 1].

Many antibiotics are using for UTI treatment :ciprofloxacin and norfloxacin ,they are effective in treating uncomplicated and complicated urinary tract infections[2].

The aim of present study was isolation and diagnosis of bacteria that causes urinary tract infections and comparative study between males and females and antibiotic susceptibility of bacteria isolated from patients .

## Patients and Methods

Three hundred patients with urinary tract infections(UTI)202( 67.33% ) females and 98 (32.66%)males were studied at Al-Hussien Hospital from 1 March to 20 October 2008 ,their age  ranged from 1-60 years .Three handred samples of urine were collected from patients ,and cultured on blood and MacConky agar media for colonies shapes , identification and characterization of isolated bacteria include Gram stain followed by microscopic examination, motility test and biochemical tests using API 20E kit (BioMerieux). Culturing features and biochemical tests (IMVic,Oxidase,TSI,Urease medium)were studied. Bacterial species were confirmation and antibiotics sensitivity were studied for 14 types of antibiotics by using disc methods(Baur-Kirby 1966)by using disc diameter (6.3)mm which were supplied from Bioanalys company ,by using Muller-Hinton agar and incubated at  37° C for 24 hours.The antibioticsdiscs used in this study are as follows:

| | |
|---|---|
| AK=Amikacin | CT=Colistin |
| Amp=Ampicillin | CTX=Cefotaxime |
| C=Chloramphenicol | E=Erythromycin |
| CEF=Cefaclor | F=Nitrofurantion |
| CFX=Cefixime | Na=Nalidixic acid |
| CL=Cephalexin | T=Oxytetracycline |
| CN=Gentamicin | TMP=Trimethprim |

## Statical analysis

The values for the distribution of patients by age and gender were analyzed by a t-test and ANOVA while percentages and frequencies [ **3**].

## Results & Discussion

The distribution of the different isolates are shown in Table 1: *E.coli* 48 (39.02%   ) , *Proteus mirabilis* 20, (16.26%   )   *Ps.euroginosa* 10, (8.13%) *Enterobacter* 8 (6.50%   ) , *Klebsiella* 1(0.81% ) , *Staphylococcus aureus* 31, ( 25.20% )*Streptococcus* 5(4.06% ) , .Table 2, showes the percentage of infections among males (32.66% ),(67.33%) females , and the maximum UTI infections in patients in age groups    (1-60) were (54%) ,whereas in another    study *E.coli, Klebsiella spp, Staphylococcus aureus ,Proteus    mirabilis,Ps.aeruginosa* infections in Khalis patients were (66.5%,14.3%,9.1%,7.1%,3%) respectively, ,wherse  the percentage of infections at the same age group  was (80.61%)                                  [4]. *E.coli,Staph.aureus,Pseudomonas,Proteus,Klebsiella* infections in Al-Najaf Hospitals                                 were (37%,25.5%,25.5%,6%,6%)respectively[5].

UTI   infections among   Karachi paediatric male were 77.2 %, 22.8% female    [ 6 ]. The  UTI infections in Nigerian patients (< 18 - > 57) years males were (60%) and  females (40%) [ 7 ]. Our results  are in contrast with those of  research workers in other countries, which could be due to differences in the environment, social habits of the community the standard of personal hygiene and differences in education [8].

### Table(1):The frequency of bacterial isolates.

| The name of bacteria | No% |
|---|---|
| E.coli | 48 (39.02%) |
| Proteus mirabilis | 20  (16.26%) |
| Ps.euroginosa | 10 (8.13%) |
| Enterobacter | 8 (6.50%) |
| Klebsiella | 1(0.81%) |
| Staph.aureus | 31(25.20%) |
| Streptococcus | 5 (4.06) |
| Total | 123(99.98%) |

### Table (2):The percentage of males and females according age groups.

| Age groups(years) | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| 1-10 | 10 | 3.33% | 33 | 11% | 43 | 14.33% |
| 11-40 | 18 | 6% | 77 | 25.66% | 95 | 31.66% |
| 41-60 | 70 | 23.33% | 92 | 30.66% | 162 | 54% |
| Total | 98 | 32.66% | 202 | 67.33% | 300 | 99.99% |

Screening assays in urinalysis play a very important role in  identification of cases of lower urinary tract infection or of pyelonephritis in both adults and children so that antimicrobial therapy is started early in the course of disease thereby limiting morbidity. Women are at greater risk than men because they have a shorter urethra and this sits in close proximity to the introitus.

The preputial sac of uncircumcised men may harbour urinary pathogens especially *Proteus causing* ascending infection [ 9 ] .

Alternations in vaginal microflora also play a critical role in encouraging vaginal colonization with coliforms and this can lead to urinary tract infection [ 10 ].

Antimicrobial susceptibility of bacterial isolates to (14) drugs was studied .Fifteen isolates of *S aureus* were susceptible to (AK), nine isolates of *E.coli* were susceptible to (AK) and (Cf) whereas (30) ,(26) ,(21) isolates of *E.coli* were resist to (C,CFX,CL,CN,CT,E) respectively (Table 3).

Bacterial isolates were resistance for antimicrobial agents : *S.aureuas* (16,16,18 ,19 ) isolates were resistance for ( C,Cfx,E,P) respectively ,*E.coli* (21,30,21,26, 27) isolates were resistance for (AMP,C,CEF,CFX,CL,CN,CT,E,P,T) . Our study was indicated  the isolates showed multi-drug resistance**,** these results agree with Nwanze study[ 7 ].

Resistance of bacterial isolates for antibiotics is because :       resistance defense devices of the body, modification of targets of antimicrobial agents[ 11 ]. lose target site of antimicrobial agents , effect of antibiotics is  inactive , non ability for invade the cells .chromosomal resistance result spontaneous mutations or plasmid play a role in antimicrobial agents resistance The use of broad-spectrum antibiotics to treat simple  infections, such as uncomplicated UTIs, may lead to the development of resistance in the treatment of more serious infections.

For this reason some experts advise reserving broad-spectrum antibiotics for more serious infections and using narrow-spectrum antibiotics[  12   ].

Duration of therapy remains controversial. Six-week regimens are not more effective than 14-day regimens for pyelonephritis. Screening for or treatment of asymptomatic bacteriuria  in those patients who were treated with antibiotics, and there were no changes in chronic genitourinary symptoms associated with antimicrobial therapy. Treatment of asymptomatic bacteriuria was associated with significantly increased adverse antimicrobial effects and reinfection with organisms of increasing resistance[  13 ] .

Women with recurrent UTI have an increased susceptibility to vaginal colonization and uropathogens, which is due to a greater propensity for uropathogenics coliforms to adhere to uroepithelial cells[  14 ] .

Our study indicated there was significant difference between the number of males and females infections, and between ratio of bacterial isolates, and relation between susceptible and resistance for antibiotics ($p > 0.05$) although there was a higher mean value for the females.

## Conclusion

A significant association between age, gender and UTI was observed. These factors should be considered in s patients with UTI to avoid UTI and its complications. The sensitivity and resistance pattern is helpful in selecting drugs for better empirical response in the treatment of UTI.

## Table(3): In vitro antibiotics sensitivity &resistance pattern of isolated organisms.

| Bacteria / Antibiotics | | *S.aureus* (31) | *Streptococcus spp* (5) | *E.coli* (48) | *Ps.aeruginosa* (10) | *Proteus spp* (20) | *Klebsiella spp* (1) | *Enterobacter spp* (8) |
|---|---|---|---|---|---|---|---|---|
| AK | S | 15 | | 9 | 4 | 4 | | 2 |
| | R | | 2 | 4 | | | | 1 |
| AMP | S | | | 2 | | | | |
| | R | 2 | 1 | 12 | 2 | | | |
| C | S | 2 | | 4 | 1 | 1 | | |
| | R | 16 | 2 | 30 | 6 | 9 | 1 | 5 |
| CEF | S | 1 | | 1 | | | | |
| | R | 6 | | 11 | 5 | | 1 | 2 |
| CFX | S | 1 | 1 | 5 | 1 | 1 | | 2 |
| | R | 16 | 3 | 19 | 3 | 9 | 1 | 3 |
| CL | S | | | | | | | |
| | R | 5 | | 19 | 1 | 2 | | 1 |
| CN | S | 1 | | 3 | 1 | | | |
| | R | 3 | 3 | 19 | | 2 | | |
| CT | S | 2 | 3 | 9 | 4 | 5 | | 3 |
| | R | 4 | 1 | 21 | 4 | 4 | 1 | 2 |
| CTX | S | | | | | | | |
| | R | | | 1 | | | | |
| E | S | 2 | | 2 | 1 | | | 1 |
| | R | 10 | 1 | 21 | 2 | 5 | 1 | |
| F | S | | | | | | | |
| | R | 1 | | | | | | |
| NA | S | 2 | | 2 | | 1 | 1 | |
| | R | | 2 | 9 | | 1 | 1 | |
| NF | S | 12 | 1 | 31 | 3 | 7 | 7 | 4 |
| | R | 3 | | 8 | 2 | 3 | 3 | 1 |
| P | S | 1 | | | | | | 1 |
| | R | 19 | 1 | 27 | 7 | 11 | 11 | 2 |
| T | S | 11 | | 4 | 2 | 4 | 4 | 2 |
| | R | 7 | 2 | 14 | 3 | 4 | 4 | 1 |
| TMP | S | | | 1 | | | | |
| | R | 2 | 1 | 6 | 2 | | | |

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