

## ANTIBIOTICS USES IN THE TREATMENT OF POSTMENOPAUSAL WOMEN WITH THE URINARY TRACT INFECTIONS ASSOCIATED WITH AND WITHOUT DIABETES MELLITUS

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### ABSTRACT

Urinary tract infections (UTIs) is the most bacterial infections in women. This study was aimed to determine the most antibiotic uses in the treatment of Postmenopausal women with urinary tract infections associated with and without diabetes mellitus. The study was included 100 patients with the age ranged from 53 - 74 years, the study was carried out in college of medicine / Anbar University, in the period from March 2023- June 2024. Patients divided into two groups according to the age: group1 (53-63years) and group 2(64-74years), also divided into two groups according to the diabetes mellitus type 2: UTI with diabetes group and UTI without diabetes group. Patients were diagnosed depending on symptoms, urine analysis and urine culture, they received different antibiotics. The present study found there were significant differences in UTIs with diabetes women between age group1 (35%) and age group 2 (57%) at  $P \leq 0.05$ . Also showed there were significant differences in UTIs without diabetes between age group1 (65%) and age group 2 (43%), at  $P \leq 0.05$ . There were significant differences in the uses of antibiotics between age groups. The high uses of ceftriaxone and levofloxacin in age group1, while ceftriaxone/metronidazole and meropenem/metronidazole in age group2. This study was concluded that the higher UTIs with diabetes in age group 2 rather than in age group1, while the higher UTIs without diabetes women in age group1 rather than in age group 2. The high uses of antibiotics according to the age groups were ceftriaxone and levofloxacin in age group1, while ceftriaxone/metronidazole and meropenem/metronidazole in group 2.

**KEYWORDS:** UTIs, antibiotics, diabetes mellitus.

## INTRODUCTION

Urinary tract infections (UTIs), also called cystitis is the most bacterial infections in women especially in postmenopausal period.<sup>[1]</sup> UTIs occur when bacteria enter the urinary tract through the urethra and reach the bladder.<sup>[2]</sup> UTIs can be divided into Uncomplicated and complicated UTIs. Uncomplicated UTIs refers that urinary tract is normal and this type of UTIs easier to treat. While complicated UTIs refers to another conditions and this type is difficult to treat. The most bacterial infections to the urinary tract is *E.coli*, *Klebsiella*, and other organisms such as *Proteus*, *Enterobacter*, and *Enterococcus*, viruses, fungus and chlamydia.<sup>[3,4,5]</sup> Elderly women with recurrent UTI should be differentiated according to the age and general status: healthy, postmenopausal women and women with or without catheter.<sup>[6,7]</sup> Another studies described the incidence and risk factors of acute cystitis among non diabetic and diabetic postmenopausal women who treated by insulin.<sup>[8,9]</sup>

A major risk factor for UTIs is the use of a urinary catheter, manipulation of the urethra is also a risk factor. Sexual intercourse and the use of spermicides and diaphragms are also risk factors for UTIs. Frequent pelvic exams and the presence of anatomical abnormalities of the urinary tract can also predispose factors for UTI.<sup>[10,11]</sup> Other risk factors include the use of antibiotics and diabetes mellitus that causes immunosuppress. UTIs is treated by antibiotics which is a good option for UTIs treatment.<sup>[12]</sup> Urine cultures are not usually need in uncomplicated UTIs but urine culture are required due to increase antibiotics resistance and to help differentiate recurrent from relapsing infections.<sup>[13,14]</sup>

## MATERIALS AND METHODS

The study was carried out in College of Medicine / Anbar University in the period of August 2023- July 2024. 100 patients were collected from Ramadi Teaching Hospital, with the age ranged from 53-74years. The Patients divided into two groups according to the age; group1(53 -63 years) and group 2(64-74years), also divided into two groups according to the diabetes mellitus type 2 into UTI with diabetes group and UTI without diabetes group. The Patients were diagnosed depending on symptoms, urine analysis and urine culture, they received different antibiotics according to the investigations of urine.

### Statistical Analysis

Data represented as ranges, percentages, frequency and used Chi-square test for comparison between age groups of UTI with diabetes and UTI without diabetes by using SAS system at  $P \leq 0.05$ ,  $P \leq 0.01$ .<sup>[15]</sup>

## RESULTS

### UTI associated with and without diabetes in age groups

The present study found there were significant differences in UTIs with diabetes women between age group 1 and 2, the UTIs with diabetes belong age group 1(53-63 years) were 35% and 57% belong age group 2(64-74 years) at  $P \leq 0.05$  as in the table1 and figure 1, thus higher UTIs with diabetes in age group 2 rather than in age group1. Also showed there were significant differences in UTIs without diabetes between age group 1 and 2, the UTIs without diabetes were 65% in age group 1(53-63 years) and 43% belong to the age group 2(64-74 years) at  $P \leq 0.05$  as in the table1 and figure 1, thus the higher UTIs without diabetes women in age group1 (53-63 years) rather than in age group 2(64-74 years). There were significant differences in age group 1(53-63 years) between UTI with diabetes (35%) and UTI without diabetes (65%) at  $P \leq 0.01$  and in age group 2 (64-74 years) between UTI with diabetes (57%) and UTIs without diabetes (43%) at ( $P \leq 0.05$ ) as in the table 1 and figure 1.

**Antibiotics Uses in UTIs in age groups**

This study showed the more frequent uses the antibiotics were ceftriaxone, ceftriaxone/metronidazole, levofloxacin and meropenem/ metronidazole.

There were significant differences for uses antibiotics in age groups as ceftriaxone in the age group 1 (53-63 years) were 20% and 8% in the age group2 (64-74 years) at  $P \leq 0.01$  as in the table 2 and figure2, uses of ceftriaxone/metronidazole in age the group1 were 7% and in the age group2 were 10% at  $P \leq 0.05$ , uses of levofloxacin in the age group 1 were 10% and in the age group 2 were 5% at  $P \leq 0.05$  and uses of meropenem/ metronidazole in the age group 1 were 15% and in age group 2 were 25%. at  $P \leq 0.01$  as in the table 2 and figure2. Therefore the high uses of antibiotics in age groups as ceftriaxone in age group1(20%), ceftriaxone/metronidazole in age group 2 (10%), levofloxacin in age group1(10%) and meropenem/ metronidazole in age group 2(25%).

**Table 1: UTI associated with and without diabetes mellitus in the postmenopausal women according to the age groups.**

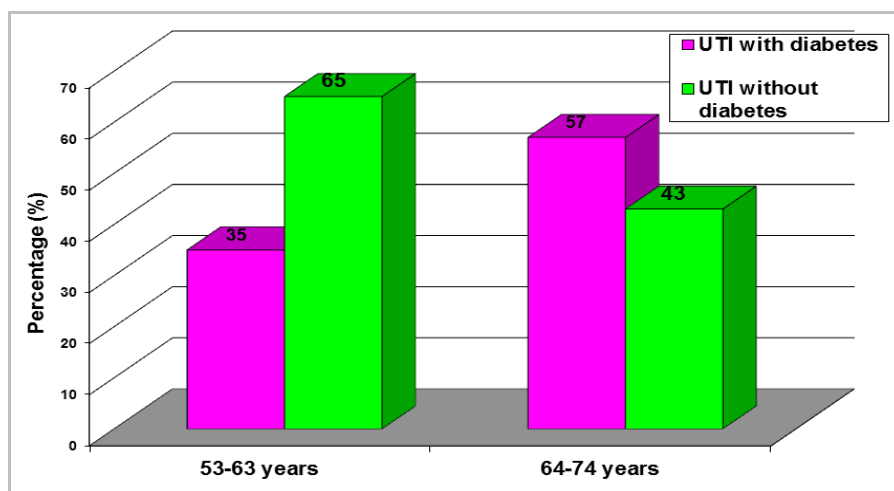
Status of patients	Group 1 (53-63 years)	Group 2 (64-74 years)	P-value
UTI with diabetes	35 (35.00%)	57 (57.00%)	0.0311 *
UTI without diabetes	65 (65.00%)	43 (43.00%)	0.0309 *
Total	100	100	---
P-value	0.0084 **	0.0487 *	---

\*\* ( $P \leq 0.01$ ), \* ( $P \leq 0.05$ )

**Table 2: Antibiotics uses in the treatment of postmenopausal women with UTIs according to the age groups.**

Antibiotics	Group 1: (53-63 years)	Group 2: (64 -74 years)	Total	P-value
Ceftriaxone	20 (20.00%)	8 (8.00%)	28 (28.00%)	0.0004 **
Ceftriaxone/metronidazole	7 (7.00%)	10 (10.00%)	17 (17.00%)	0.0376 *
Levofloxacin	10 (10.00%)	5 (5.00%)	15 (15.00%)	0.0458 *
Meropenem/ metronidazole	15 (15.00%)	25 (25.00%)	40 (40.00%)	0.0001 **
Total	52 (52.00%)	48 (48.00%)	100	0.689 NS
P-value	0.0078 **	0.0061 **	0.0001 **	---

\* ( $P \leq 0.05$ ), \*\* ( $P \leq 0.01$ ).



**Figure 1: UTIs associated with and without diabetes mellitus in the postmenopausal women according to the age groups.**

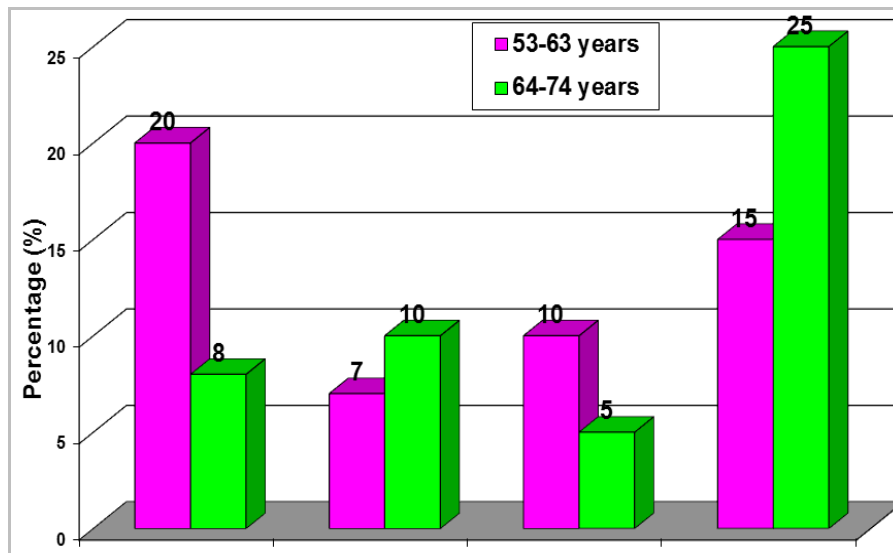


Figure 2: Antibiotics uses in the postmenopausal women with UTIs according to the age groups.

## DISCUSSION

UTIs is the most bacterial infections in women especially in postmenopausal period. This study showed there were significant differences in UTIs with diabetes women between age group 1(53-63 years) and age group2 (64-74 years), also there were significant differences in UTIs without diabetes women between age groups 1and 2. The higher UTIs with diabetes in age group 2 (57%) and the higher UTIs without diabetes women in age group 1(65%). This explain there is association between diabetes mellitus and risks for UTI due to age, gender, short urethra in the female and location of urinary tract near the reproductive organs in the women, frequency of sexual intercourse which is a major risk factor for UTI, hormonal changes, fluctuations in estrogen levels may modify the vaginal microbiome result in increased chances of infection urinary tract, pregnancy and diabetes mellitus, use of immunosuppressive drugs.<sup>[16,17,18]</sup> Diabetic women may be more susceptible to infect by uncommon microorganisms because of diabetes facilitates the same route of infection for UTI in without diabetic women.<sup>[19,20]</sup>

According to the World Health Organization, diabetes is a chronic, metabolic disease characterized by increased levels of glucose in the blood which occurs when the body becomes resistant to insulin or doesn't make enough insulin. Diabetes causes serious damage in different organs such as heart, blood vessels, eyes, kidneys and nerves. Therefore Urinary tract infection is a common problem in postmenopausal women with type 2 diabetes mellitus.<sup>[21]</sup>

The previous study observed that the most infections with *Klebsiella* and *Enterococcus* in diabetic women, this is due to the defenses against these microorganisms may be decreased and similar virulence of *E. coli* that isolated from women with and without diabetes.<sup>[22]</sup> Therefore diabetes mellitus type 2 is risk factor that increase incidence of UTI in postmenopausal women who are immunosuppressed.<sup>[23]</sup>

This study showed significant differences in the uses of ceftriaxone, ceftriaxone/metronidazole, levofloxacin and meropenem/ metronidazole in age group 1 and 2.The high uses of antibiotics in age groups were ceftriaxone in age group1(20%), ceftriaxone/metronidazole in age group 2 (10%), levofloxacin in age group1(10%) and meropenem/ metronidazole in age group 2(25%). Uses of antibiotics according to the guidelines and resistance of bacteria to the antibiotics. Ceftriaxone is a broad-spectrum cephalosporin antibiotic, Ceftriaxone acts by inhibiting the synthesis of

bacterial cell wall and has a good activity against multi-drug resistant as in urinary tract.<sup>[24,25]</sup> Metronidazole enters the organism and inhibits protein synthesis by interacting with DNA, and causes cell death in susceptible organisms. It is used in the broad range against infections in different tissues.<sup>[26,27]</sup>

Levofloxacin interferes with the bacterial DNA metabolism by inhibiting bacterial DNA gyrase and topoisomerase IV, which are necessary for bacterial DNA replication.<sup>[28,29]</sup> Meropenem is a broad-spectrum carbapenem antimicrobial agent. It acts against Gram positive and Gram negative bacteria. Meropenem acts by entering bacterial cells and interfering with the synthesis of bacterial cell wall resulting in cell death. Therefore early treatment of UTI leads to shorten the length of symptoms and decrease UTI complications.<sup>[30,31]</sup>

## CONCLUSION

This study was concluded that the higher UTIs with diabetes in age group 2(64-74 years) rather than in the age group 1(53-63 years), while the higher UTIs without diabetes women in the age group 1(53-63 years) rather than in age group 2(64-74 years). The high uses of antibiotics according to the age groups were ceftriaxone and levofloxacin in age group 1 and ceftriaxone/metronidazole and meropenem/metronidazole in age group 2.

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