WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 19, 1-9. Research Article ISSN 2277–7105

ANTIBIOTICS USES IN THE TREATMENT OF WOMEN WITH THE URINARY TRACT INFECTIONS IN DIFFERENT AGES

Inssaf IH. Al–Shemmary*

Assist. Prof. Dr. in department of Pharmacology in College of Medicine, University of Anbar, Al-Ramadi, Iraq.

Article Received on
14 August 2024,

Revised on 03 Sept. 2024,
Accepted on 23 Sept. 2024

DOI: 10.20959/wjpr202419-33987

***Corresponding Author**
Inssaf IH. Al–Shemmary
Assist. Prof. Dr. in department of Pharmacology in College of Medicine, University of Anbar, Al-Ramadi, Iraq.

ABSTRACT

Objective: The present study was aimed to determine the most antibiotics uses in the treatment of urinary tract infections in the different ages of women with the UTIs. **Methods:** The study was carried out in College of Medicine / Anbar University in the period of August 2023- July 2024. Total 100 patients were collected from Ramadi Teaching Hospital, with the age ranged from 15 - 47years. women were divided into three groups according to the age, group 1(15 - 25years), group 2 (26 – 36 years) and group 3(37 – 47years). Also patients were divided into two groups according to the marital status: married and unmarried groups. Patients were diagnosed by the symptoms, urine analysis and urine culture. Patients received different antibiotics for treatment. **Results**: This study showed there were significant differences among age group 1(15–25 years), group 2(26–36 years) and group 3(37–47 years) of women with UTI according to the age at P≤0.01, highly percentage of UTI in women in the group 1 (49%), then, group 2 (35%) and the less in the group 3 (16%). Higher percentage of UTI in married women (71%) rather than unmarried women (29%) and highly uses of antibiotics as ceftriaxone in age group 2(29%), ceftriaxone / metronidazole in age group 1(21%) and levofloxacin in age group 1(5%) . The higher uses of antibiotics in hundred women were ceftriaxone (54%) followed by ceftriaxone / metronidazole (38%), then levofloxacin (8%).**Conclusions:** This study found that the higher UTI in women belong to the age group 15-25years, followed by age group 26-36 years and the less UTI in the age group 36-47 years, also this study found high infections of urinary tract in married rather than unmarried women and high uses of

ceftriaxone followed by ceftriaxone / metronidazole and the less uses was levofloxacin in the treatment of women with the UTI.

KEYWORDS: UTI, antibiotics.

INTRODUCTION

The urinary tract infections (UTIs) is a common type of infection in the urinary system, It can affected any part of urinary system such as kidneys, ureters, bladder and urethra, but the most infections that involve the bladder and the urethra and very common infection in females.[1,2] UTI can be classified into two types as complicated or uncomplicated. The uncomplicated UTI which is called cystitis or lower UTI, is the common type of UTI and it occurs mainly in patients have no anatomical abnormalities and functional disorders of urinary tract also have no certain diseases such as diabetes, immunocompromised state, or pregnancy.The symptoms of UTI involve urinary frequency, suprapubic discomfort, urgency and dysuria.[3,4,5] Complicated UTI, this type with significant morbidity and mortality which may lead to florid urosepsis. Several risk factors can complicate UTIs, leading to treatment failure and recurrence of infections, this type involved immunocompromised patients, males, pregnant patients, and the patients associated with fever, stones, sepsis, urinary obstruction, and complicated kidneys infections.[6,7,8] UTI caused by bacteria such as *Escherichia coli*, as the major pathogenic microorganism, *Klebsiella* and other important organisms such as *Proteus*, *Enterobacter*, *Enterococcus*[9], herpes viruses, gonorrhea, chlamydia, mycoplasma, fungus and other intracellular microorganisms.[10,11,12]

Antibiotics therapy is a successful option for treatment of UTI, lead to shorten the length of symptoms.[13] The treatment has varied from 3 days to 6 weeks, As sever UTI, life-threatening sepsis and multiorganisms involvement, the patients are needed antibiotics therapy especially broad-spectrum antibiotics.

The choices of antibiotics should always made according to the local bacterial resistance patterns and guidelines.[14,15] Management of recurrent urinary tract infections typically involves optimizing personal hygiene, using vitamin C as a urinary acidifier and using prophylactic antibiotics or antiseptics such as nitrofurantoin and methenamine.[16]

MATERIALS AND METHODS

Patients: The study was carried out in College of Medicine / Anbar University in the period of August 2023- July 2024. Total 100 patients were collected from Ramadi Teaching Hospital, with the age ranged from 15 - 47years, after obtaining ethical approvals for this study, patients were divided into three groups according to the age: group 1(15 - 25years), group 2 (26 - 36years) and group 3(37–47 years) . Also patients were divided into two groups according to the marital status: married and unmarried groups. The patients were diagnosed according to symptoms, urine analysis and urine culture, they were receiving different antibiotics according to investigate urine of patients.

Statistical Analysis

Data were demonstrated as ranges, percentages and used Chi-square test to compare among group 1, group 2 and group 3 as well as between married and unmarried groups by using SAS system at $P \leq 0.05$, $P \leq 0.01$.[17]

RESULTS

Women With UTI According to the Age

This study showed there were significant differences among age groups as group 1(15–25 years), group 2(26–36 years) and group 3(37–47 years) of patients with UTI according to the age at $P \leq 0.01$, as in the table 1 and figure 1, also there were highly percentage of UTI in women in the group 1, then, group 2 and the less in the group 3, the percentage of UTI in group 1,2 and 3 were 49%, 35%, 16% respectively as in the table 1and figure 1.

Women With UTI According to Marital Status

According to the marital status , this study showed significant differences between married and unmarried women with the UTI at $P \leq 0.01$, there were highly percentage of UTI in married women (71%) rather than unmarried women (29%). as in the table 2 and figure 2.

Antibiotics Uses Among Groups

This study showed the most antibiotics uses for treatment women with the UTI were ceftriaxone, levofloxacin and ceftriaxone/metronidazole. There were significant differences in the uses of ceftriaxone, ceftriaxone/metronidazole and levofloxacin among age groups for treatment women with the UTI. Uses of ceftriaxone in the age groups 1, 2 and 3 were 20%, 29%, 5% respectively at $P \leq 0.01$and the percentage of uses ceftriaxone / metronidazole in age groups 1,2 and 3 were 21%, 14%, 3% respectively at $P \leq 0.01$ as in the table 3and figure 3.

Also uses of levofloxacin for treatment women in the age groups 1, 2 and 3 were 5%, 3% and 0.00% respectively at P≤0.05 as in the table 3 and figure 3. the higher uses of antibiotics in age groups were ceftriaxone in the age group 2 (29%), followed by ceftriaxone / metronidazole were in the age group 1(21%), then, levofloxacin were in the age group 1(5%) as in the table 3 and figure 3. The higher uses of antibiotics in hundred women were ceftriaxone (54%) followed by ceftriaxone/metronidazole (38%), then levofloxacin (8%) as in the table 3.

Table 1: Frequency and percentage of women with the UTI according to the age.

Age Group	Frequency	Percentage (%)
Group 1 (15–25 years)	49	49.00
Group 2 (26–36 years)	35	35.00
Group 3 (37–47 years)	16	16.00
Total 100	100	100%
Chi-square test $-\chi^2$ (P-value)	---	16.636 ** (0.0002)
** (P≤0.01).		

Table 2: Frequency and percentage of women with the UTI according to the marital status.

Marital Status	Frequency	Percentage (%)
Married women	71	71.00
Unmarried women	29	29.00
Total	100	100%
Chi-square test $-\chi^2$ (P-value)	---	17.640 ** (0.0001)
** (P≤0.01).		

Table 3: Antibiotics uses in the treatment of women With the UTI according to the age groups.

Antibiotics	Age 15-25 years	Age 26-36 years	Age 37-47 years	Total	P-value
Ceftriaxone	20 (20.00%)	29 (29.00%)	5 (5.00%)	54 (54.%)	0.0001 **
Ceftriaxone/metronidazole	21 (21.00%)	14 (14.00%)	3 (3.00%)	38 (38.00%)	0.0001 **
Levofloxacin	5 (5.00%)	3 (3.00%)	0 (0.00%)	8 (8.00%)	0.0216 *
Total	46 (46.00%)	46 (46.00%)	8 (8.00%)	100	0.0001 **
P-value	0.0081 **	0.0001 **	0.0483 *	0.0001 **	---
* (P≤0.05), ** (P≤0.01).					

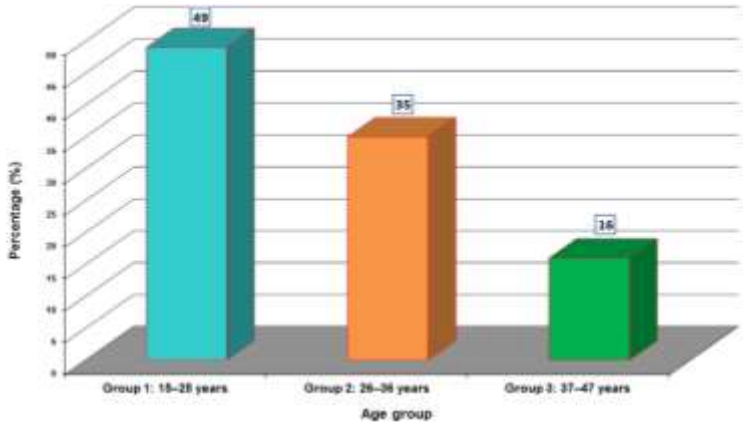

Figure 1: Frequency and percentage of women with the UTI according to the age.

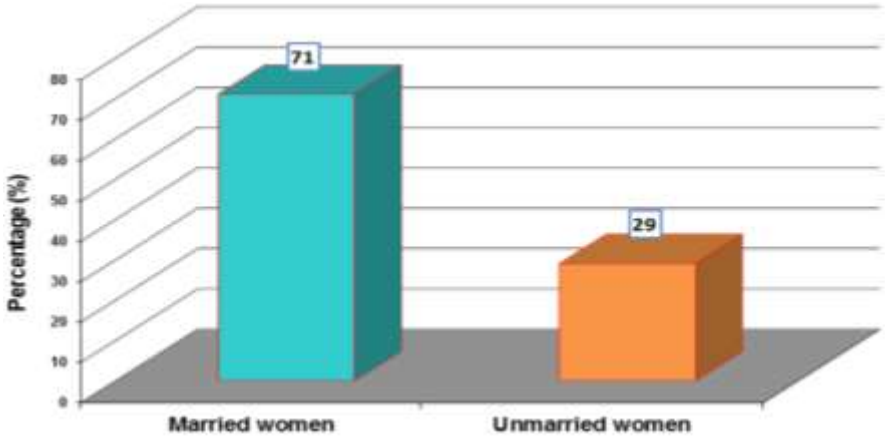

Figure 2: Frequency and percentage of women with the UTI according to the marital status.

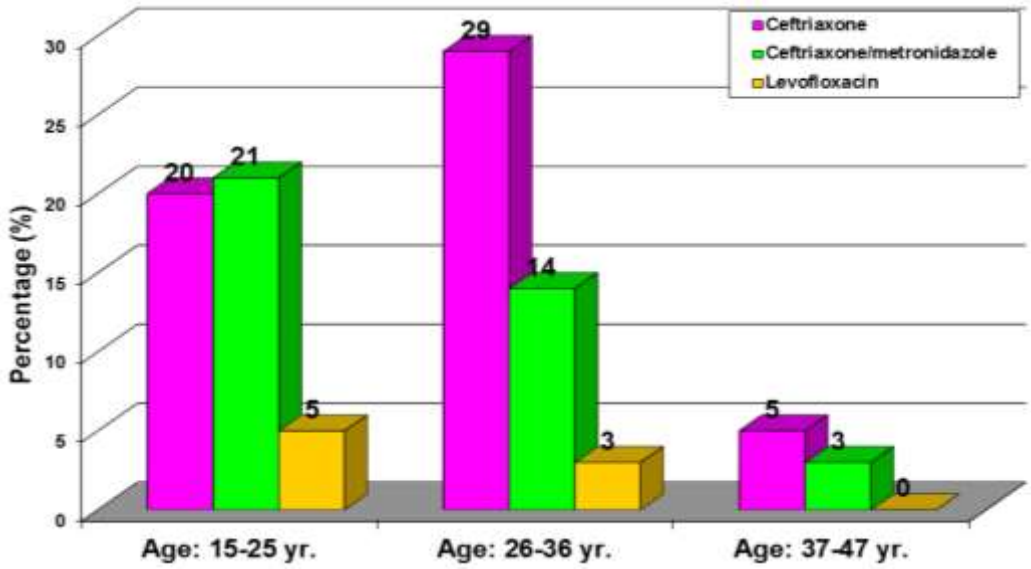

Figure 3. Antibiotics used in the treatment of women with the UTI according to the age.

DISCUSSION

The study showed that there significant differences among age groups 1, 2 and 3 for UTI according to the age. The UTI is the most common infection in women due to short urethra and the location of urinary tract near the reproductive organs in the females, this is lead to decreases the distance for entering the bacteria as Escherichia coli, Enterococcus fecalis, and Streptococcus species.[18,19] The study found that the UTI were 49% of the participants belonged to the age group15- 25-years followed by 35% who belonged to the age group 26-36-years and the less (16%) in the age group 37-47 years. This result due to several factors such as sexual activity in younger women with age 15- 25 years (in group 1) and more sexually active than old women which can increase the risk for UTIs[20,21], the hormonal changes during the menstrual cycle can affect the urinary tract and fluctuations in estrogen levels may modify the vaginal microbiome result in increased chances of infected urinary tract.

Also the study found that the married women were higher UTI (71%) than unmarried women (29%), this increases of UTI in the married than unmarried may be due to sexual activity, pregnancy, miscarriages, premature births, and the underdevelopment of infants that increased risk factors for UTI.[22,23,24]

Antibiotics are a good choice for treatment of UTI, this study found that women used ceftriaxone (54%), ceftriaxone / metronidazole (38%) and levofloxacin (8%) for treatment UTI. Ceftriaxone is a broad-spectrum cephalosporin antibiotic, Ceftriaxone acts by inhibiting the mucopeptide synthesis in the bacterial cell wall. and has a good activity against multi-drug resistant, it used in the treatment of bacterial infections in different tissues such as respiratory tract, skin, soft tissue, and urinary tract.[25,26] Metronidazole acts by interring the organism and inhibits protein synthesis by interacting with DNA, and causes a loss of helical DNA structure and strand breakage. Therefore, it causes cell death in susceptible organisms. It used in the broad range against infections in the intestinal amebiases, liver amebiasis, bacterial septicemia, bone and joint infections, central nervous system ,endocarditis, endometritis, lower respiratory tract infections, skin and surgical prophylaxis.[27,28]

Levofloxacin interferes with the bacterial DNA metabolism by inhibiting bacterial DNA gyrase and topoisomerase IV, which are necessary for bacterial DNA replication, transcription, repair, and recombination.[29,30] Therefore early treatment of UTI lead to shorten the length of symptoms and decrease UTI complications.

CONCLUSIONS

This study found that the higher UTI in women belong to the age group 15-25 years, followed by age group 26-36 years and the less UTI in age group 36-47 years, also this study founded high infections of urinary tract in married rather than unmarried women. High uses of ceftriaxone followed by ceftriaxone / metronidazole and the less uses was levofloxacin in the treatment of women with the UTI.

REFERENCES

1. Long B, Koyfman A. The Emergency Department Diagnosis and Management of Urinary Tract Infection. Emerg Med Clin North Am, 2018 Nov; 36(4): 685-710.
2. Chernaya A, Søborg C, Midttun M. Validity of the urinary dipstick test in the diagnosis of urinary tract infections in adults. Dan Med J, 2021 15; 69(1).
3. Five-day nitrofurantoin is better than single-dose fosfomycin at resolving UTI symptoms. Drug Ther Bull, 2018 Nov; 56(11): 131.
4. Long B, Koyfman A. The Emergency Department Diagnosis and Management of Urinary Tract Infection. Emerg Med Clin North Am., 2018; 36(4): 685-710.
5. Tang M, Quanstrom K, Jin C, Suskind AM. Recurrent Urinary Tract Infections are Associated With Frailty in Older Adults. Urology, 2019 Jan; 123: 24-27.
6. Shortridge D, Duncan LR, Pfaller MA, Flamm RK. Activity of ceftolozane-tazobactam and comparators when tested against Gram- negative isolates collected from paediatric patients in the USA and Europe between 2012 and 2016 as part of a global surveillance. programme. Int J Antimicrob Agents, 2019; 53(5):637-643.
7. Shi H, Kang CI, Cho SY, Huh K, Chung DR, Peck KR. Follow-up blood cultures add little value in the management of bacteremic urinary tract infections. Eur J Clin Microbiol Infect Dis, 2019 38(4):695- 702.
8. Parveen SS, Reddy SV, Rama Rao MV, Janardhan Rao R. Uropathogens and their drug susceptibility patterns among pregnant women in a teaching hospital. Ann Biol Res, 2011; 2(5): 516–521.
9. Behzadi P, Behzadi E, Yazdanbod H, Aghapour R, Akbari Cheshmeh M, Salehian Omran D. A survey on urinary tract infections associated with the three most common uropathogenic bacteria. Maedica (Bucur), 2010; 5(2): 111-5.
10. Suresh J, Krishnamurthy S, Mandal J, Mondal N, Sivamurukan P. Diagnostic Accuracy of Point-of-care Nitrite and Leukocyte Esterase Dipstick Test for the Screening of Pediatric Urinary Tract Infections. Saudi J Kidney Dis Transpl, 2021; 32(3):703-710.

11. Yamaji R, Friedman CR, Rubin J, Suh J, Thys E, McDermott P, Hung-Fan M, Riley LW. A Population-Based Surveillance Study of Shared Genotypes of Escherichia coli Isolates from Retail Meat and Suspected Cases of Urinary Tract Infections. mSphere, 2018 ; 3(4)
12. Ahmed E, Shahid HM, Ikhlaque SS, Ejaz M. Urinary tract bacterial pathogens and their sensitivity pattern J. Rawalpindi Med, Coll. (JRMC), 2014;18(2):263–266.
13. O'Grady MC, Barry L, Corcoran GD, Hooton C, Sleator RD, Lucey B. guidelines? J Antimicrob Empirical treatment of urinary tract infections: how rational are our Chemother, 2019; 74(1): 214-217.
14. Ditkoff EL, Theofanides M, Aisen CM, Kowalik CG, Cohn JA, Sui W, Rutman M, Adam RA, Dmochowski RR, Cooper KL. Assessment of practices in screening and treating women with bacteriuria. Can J Urol, 2018; 25(5):9486-9496.
15. Lemoine L, Dupont C, Capron A, Cerf E, Yilmaz M, Verloop D, management of urinary tract infections in 134 French nursing homes. Med Mal Infect, 2018;48(5):359-364.
16. Anger J, Lee U, Ackerman AL, Chou R, Chughtai B, Clemens JQ, Hickling D, Kapoor A, Kenton KS, Kaufman MR, Rondanina MA, Stapleton A, Stothers L, Chai TC. Recurrent Uncomplicated Urinary TractInfections in Women: AUA/CUA/SUFU Guideline, J Urol., 2019; 202(2): 282-289.
17. Fihn SD. Clinical practice. Acute uncomplicated urinary tract infection in women. N Engl J Med, 2003; 349: 259-266.
18. Vasudevan R. Emergence of UTI causing *Staphylococcus aurous* as a superbug: Has the pathogen reduced the options of antimicrobial agents for treatment. EC Microbiol, 2015; 1: 88–112.
19. Griebling TL. Urologic diseases in America project. J Urol, 2005; 173: 1281-1287.
20. Hooton TM, Scholes D, Hughes JP, et al. A prospective study of risk Med. factors for symptomatic urinary tract infection in young women. N Engl J, 1996; 335(7): 468-474.
21. Anuli S, Clement I, Basseye A. Review on the prevalence and Exp Biol predisposing factors responsible for urinary tract infection among adults. Eur J, 2016; 6(4): 7-11.
22. Imade PE, Izekor PE, Eghafona NO, Enabulele OI, Ophori E. Asymptomatic bacteriuria among pregnant women. N Am J Med Sci, 2010; 2(6): 263-6.
23. Neupane H, Adhikari S, Aryal B. Asymptomatic bacteriuria among teaching hospital in pregnant women attending the outpatient clinics of Chitwan medical Chitwan, Nepal. IRJP, 2012; 3(11): 78-80.
24. Rohini U, Reddy G, Kandati J, Ponugoti M. Prevalence and associate risk factors of asymptomatic bacteriuria in pregnancy with bacterial pathogens and their antimicrobial

susceptibility in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol, 2017; (6): 558-62.

25. Bannister, Laura Hill, Nguyen, Tammy. 651: evaluation of single-dose, ceftriaxone treatment of Urinary Tract Infections. Critical Care Medicine, 2019; 47(1): 306.
26. Balsam Elajouz, Lisa E Dumkow, Lacy J. Worden, Kali M VanLangen. Three-day ceftriaxone versus longer durations of therapy for inpatient treatment of uncomplicated urinary tract infection. Antimicrob Steward Healthc Epidemiol., 2022; 2(1): e171.
27. Löfmark S, Edlund C, Nord CE. Metronidazole is still the drug of choice for treatment of anaerobic infections. Clin Infect Dis, 2010; 50 Suppl., 1: S16-23.
28. Hernández Ceruelos A, Romero-Quezada LC, Ruvalcaba Ledezma JC, López Contreras L. Therapeutic uses of metronidazole and its side effects: an update. Eur Rev Med Pharmacol Sci., 2019 Jan; 23(1): 397-401.
29. Hooper D.C. Emerging mechanisms of fluoroquinolone resistance. Emerg Infect Dis, 2001; 7(2): 337–41.
30. Trinchiere A. Role of levofloxacin in the treatment of urinary tract infections. Arch Ital Urol Androl, 2001 Jun; 73(2): 105-13.