

# The Most Prescribed Antibiotics for Urinary Tract Infections in Pregnant Women in Nasiriya City-South of Iraq

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**Abstract**— Antibiotics are chemicals or natural compounds that act by fighting various types of bacterial infections including urinary tract infection in pregnant women which is considered the most vulnerable patients to such infection due to several factors which may be hormonal, anatomical etc. The aim of this recent study is to confirm a pattern of antibiotic selection used for urinary tract infection in pregnant women in Nasiriya city- South of Iraq. Ninety pharmacies were asked about the antibiotics prescribed for their patients, the doses, dosage form, dose frequency, concomitant drugs (aim from administration of these drugs with antibiotics) and adverse effect. The study period was extended from January 2022 till August 2022. From this study , the most dispensed antibiotics were Cefexime 35.5% in a dose 400 mg capsule every twelve hours and the most frequently prescribed dosage form according to the physicians feedback and the analysis of the data was displayed the oral administration either (tablets or capsules) and it is less commonly prescribed are parenteral antibiotics . In this work cefixime was the most dispensed with a percent (35.5) cefixime may be due to it because there is more prescription due to safety during pregnancy, also it available in pharmacies

**Keywords**— Antibiotics, pregnant women, urinary tract infection, Nasiriya city.

## I. INTRODUCTION

Antibiotics are compounds kill (bactericidal) or suppress the growth (bacteriostatic) of various types of bacteria and they are used as prophylaxis or for the management of different pathogen or infections, some of them used as antiprotozoal , in contrast they cannot act against viruses [1]. Antibiotics are categorized in a

different method i.e. based on their pharmacodynamics and the chemical structure of them, table (1.1) summarized the antibiotics that are classified according to their chemical structure , table (1.2) display the classification of antibiotics according to their pharmacological effects [3].

TABLE 1: Classification of antibiotics according to their chemical structure [2].

Penicillins	1. Natural:- Penicillin G, Penicillin-VK 2. Penicillinase Resistant: - Methicillin, Nafcillin, Oxacillin and other. 3. Aminopenicillins:- Ampicillin
Fluoroquinolones	First generation:- Norfloxacin, Ofloxacin, Ciprofloxacin, Pefloxacin. Second generation:- Levofloxacin, Moxifloxacin, Lomefloxacin, Gemifloxacin, Sparfloxacin, Prulifloxacin.
Aminoglycosides	Streptomycin, Gentamycin, Kanamycin, Tobramycin, Amikacin, Sisomicin, Netilmicin.
Monobactams	Aztreonam
Carbapenems	Imipenem, Meropenem, Faropenem, Doripenem
Macrolides	Azithromycin, Clarithromycin, Dirithromycin, Erythromycin, Clindamycin, Roxythromycin
Others	Clindamycin, Vancomycin, Linezolid, Rifamycin, Tetracyclin, Trmethoprim/Sulfamethoxazole, Chloramphenicol and others .



TABLE 2: Classification of antibiotics according to their pharmacological effects [3].

Antibiotic Grouping By Mechanism	
Cell Wall Synthesis	Penicillins, Cephalosporins, Vancomycin, Beta-lactamase inhibitors, Carbapenems, Aztreonam, Polymyxin, Bacitracin
Protein Synthesis Inhibitors	Inhibit 30s Subunit:- Aminoglycosides (gentamicin). Inhibit 50s Subunit:- Macrolides, Chloramphenicol, Clindamycin, Linezolid, Streptogramins.
DNA Synthesis Inhibitors	Fluoroquinolones, Metronidazole
RNA synthesis Inhibitors	Rifampin
Mycolic Acid synthesis inhibitors	Isoniazid
Folic Acid synthesis inhibitors	Sulfonamides, Trimethoprim

The target sites of the antibiotics are as follows: Cell wall synthesis inhibition, disruption of cell wall function, destruction of nucleic acid structure or function protein synthesis inhibition and antagonism of the major metabolic pathways[4], figure(1-1)

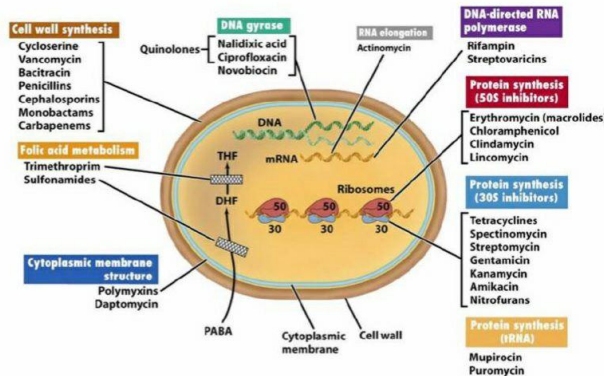


Fig.1: Pharmacodynamics of a various antibiotics [5].

The renal system is critical for electrolyte homeostasis and the excretion of various water-soluble byproducts [6]. Urinary tract infections (UTIs) are a pregnancy-related illness [7]. While most females are susceptible to UTIs, pregnant women are especially vulnerable due to urethral dilatation and urine stagnation within the urinary bladder[8,9], this stagnation could be caused by a pregnant uterus compressing the bladder [9]. UTIs are caused by the growth of a large number of pathogenic bacteria in the urinary tract [10].

Antibiotics and other medications can be used to treat UTI [11,12]. Pyelonephritis is the most common condition that can occur in pregnant women and has a poor prognosis for both the mother and the fetus [7,13].

Anatomical and changes in hormones during pregnancy increase the risk of UTIs, which may be due to female urethral shortness [14].

When bacteria infiltrate the urethra, they infect the rest of the urinary tract, resulting in UTI. As the gestational age increases from 28 weeks to labor, urethral dilation occurs [15], this is attributed to an increase in female sex levels.

UTIs during pregnancy are harmful for both mothers and fetuses. Premature labor, low birth weight, and fetal death are all more likely in pregnant women with pyelonephritis [17].

TABLE 3 . Urinary Tract Infection Risk Factors During Pregnancy [8,9,14,16].

Asymptomatic bacteriuria	Neurological problem
Diabetes mellitus	Neurogenic bladder .
History of Chlamydia trachomatis	Paralysis from spinal cord injury
Increasing age	Sexual activity
Increasing parity	Sickle cell trait and anemia
Low socioeconomic status	Urinary tract anomalies and renal calculi

Antibiotic treatment for UTIs in pregnant women requires identifying and isolating the causative agent in order to optimize maternal and fetal outcomes. Among these agents are –Lactams, Nitrofurantion, Fosfomycin, and others [11,12].

### Subject:

Ninety pharmacies that were dispensing various antibiotics according to a prescription of physicians for pregnant women with UTI were visited in this work. This survey was created to discover which antibiotics were more frequently used, what adverse event was happened more commonly, which pharmaceutical forms was dispensed by physician and pharmacists, what is the main goals of the doctors from their dispensing. All these questions were considered and responded via consultations with physicians and pharmacist according to the survey was created for this research.

## II. METHOD

The research period was extended for about 8 months during that time there are many questions were answered by doctors of gynecology obstetric specialties, pharmacists and physicians who deal with various infection including UTI in pregnant women They all answered the questions of the survey through meeting them at the clinics and then the data the data was possessed and interpreted by statistical program SPSS (statistical package for social sciences) version 25. Differences will statistically-regard significant for ( $P$ -value) less than (0.05).

## III. RESULTS AND DISCUSSION

From this study, the most dispensed antibiotics was Cefexime (35.5%) at a dose of 400 mg capsule every twelve hour then followed by amoxicillin (17.7%) at a dose of 500 mg capsule every eight hours, followed by Nitrofurantoin (14.4%) at a dose of 100mg capsule once

daily ,after that Augmentine (11.1%) at a dose of 625 mg tablet every 12 hours , followed by Ceftriaxone injection (5.5%) at adose of 1000mg injection every 24hour all other antibiotics were account for the remaining share. Table 4 displays the kinds of prescribed antibiotics and patients.

TABLE 4: Kinds of prescribed antibiotics and patients

Prescribed antibiotics	Number of patients	%	Dose and dosage form
Cefexime	32	35.5%	400mg capsules/ 12 hour
Amoxicilline	16	17.7%	500mg cap/ every 8 hours
Nitrofurantine	13	14.4%	100 mg/ every 24 hour
Augmentine	10	11.1%	625 mg tablet every 12 hour
Ceftriaxone	5	5.5%	1000mg injection every 24hour
Others	14	15.5%	Different doses and dosage form
Total	90	100%	

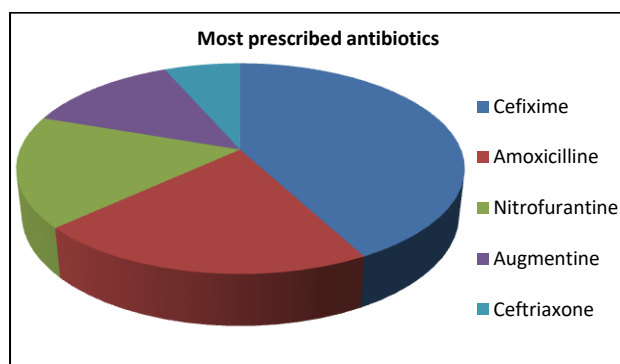


Fig 2: Percentage of most prescribed antibiotics

In relation to the question of which pharmaceutical forms was the most frequently prescribed according to the physicians feedback and the analysis of the data display that the most favored pharmaceutical forms was the dosage forms for oral administration either (tablets or capsules) and there is less commonly prescribed of parenteral antibiotics .

The most prescribed concomitant drugs were the drugs prescribed traditionally for pregnant women as folic acid 76%, multivitamin 83%, and drugs for management of uterine contraction 38%. In addition to the drugs used as adjunct agent for antibiotics for treatment of UTI like ural powder 28%, phenazopyridine tablets 30% and cranberry 12% and acetaminophine tablets 26% as antipyretic for fever that occurs as symptoms of UTI.

Availability of various category antibiotics that need to be tested of their margin of safety during pregnancy , potency and benefits of administration in order to identify the preferred standard of choice whatever satisfy with WHO standards [18] . Some studies has discovered the practice of antibiotics prescribing was partly strayed from the norm of WHO and some of these researches preferred to increase the follow up on an antibiotics prescribing practice through establishing some agencies drugs information center, drug bulletins and establishing drug and therapeutic committee[18] . In this work cefixime was the most dispensed with percent (35.5) cefixime due to its safety during pregnancy, also it available in pharmacies.

Our result consistence with previous studies that show: Cefixime is FDA Category (B).

The studies of reproduction in animals have shown no evidence of teratogenicity Its efficacy against broad spectrum of bacteria , well-studied safety, a long half-life allowing once-daily dosing increasing the patient adherence , and resistant to beta- lactamase [19].

The most prescribed dosage form was oral dosage form due to the convenience and easily swallowed.

This work showed the most concomitant prescribed drugs was that act as adjunct therapy for UTI and treated dysuria and urgency and this finding was agreed with other study [19]. Arising from irritation of the lower urinary tract mucosa caused by infection, frequent urination due to urinary tract infection, as well as acetaminophen was prescribed for fever and discomfort associated with UTI. This consistency with other studies were prescribed paracetamol as antipyretic and analgesic.

Availability of a various antibiotics with different spectrums of activity against various types of bacteria either different mechanism with a different safety profile during concerning giving more flexibility for a physician to select more effective and the most proven safety profile and most convenient antibiotics which was cefixime capsules.

#### CONFLICT OF INTEREST

Authors declare that they have no conflict of interest.

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