Volume 10, Issue 02, February 2024,
Publish Date: 22-02-2024
Doi https://doi.org/10.55640/ijmsdh-10-02-14

International Journal of Medical Science and Dental Health **(Open Access)**

PREVALENCE OF BACTERIAL URINARY TRACT INFECTIONS AND ANTIMICROBIAL SENSITIVITY AMONG PREGNANT WOMEN IN ANBAR GOVERNORATE

ABDUL SALAM ABDUL SATTAR ABDUL AZEZ[1], HADEEL AHMED KENOOSH[2], MAHMOUD SHEHAB AL-HEETY[3], MOHAMMED NAZHAN RADAAN ALQAISI[4]

[1,2]Department of Medical Laboratories Techniques, Al-Maarif University College, Al-Anbar - Iraq

[3,4]Anbar Health office, Heet general hospital, Anbar -Iraq

ABSTRACT

Background: Escherichia coli (E. coli) is recognized to be a prominent source of uropathogens in women worldwide. Urinary tract infection in pregnant women continues to cause clinical issues, which is a significant load on clinicians. **Objective:** The study aims to investigate the frequency of bacterial urinary tract infections among pregnant women and assess the susceptibility of these pathogens. **Method:** Urine samples 65 were collected from pregnant women in Anbar Governorate, were identified utilizing colony characteristics the organisms' gram stain response, biochemical assays Susceptibility testing aligns to the standard techniques defined by the Clinical and Laboratory Standard Institute guideline. **Results:** In this study, 95% (60 out of 65) of urinary tract infections (UTIs) were culture-positive. Among the identified bacteria, six distinct types were observed. The most prevalent Gram-negative isolate was Escherichia coli, accounting for 88.3% of cases, followed by Proteus mirabilis at 1.6%. Gram-positive bacteria were also identified, with Staphylococcus aureus representing 6.6% and Streptococcus at 3.3% of cases. E. coli showed resistance to ciprofloxacin (50%), norfloxacin (19%), ceftriaxone (90%), ampicillin (89%), meropenem (10%), and nitrofurantoin (60%). Staphylococcus aureus exhibited resistance to ciprofloxacin (73%), norfloxacin (35%), ceftriaxone (50%), ampicillin (71%), meropenem (8%), and nitrofurantoin (45%). Proteus mirabilis displayed resistance to ciprofloxacin (46%), norfloxacin (16%), ceftriaxone (62%), ampicillin (90%), meropenem (25%), and nitrofurantoin (33%). Streptococcus showed resistance to ciprofloxacin (43%), norfloxacin (54%), ceftriaxone (37%), ampicillin (88%), meropenem (30%), and nitrofurantoin (87%). **Conclusion:** Majority UTIs were caused by Gram-negative bacteria, especially E. coli. Resistance to ampicillin, nitrofurantoin, and ciprofloxacin was common, while norfloxacin and meropenem showed sensitivity. Regular urine culture during pregnancy is vital to lower UTI risk and antibiotic resistance.

Keywords: Urinary Tract Infections, Pregnancy, Antimicrobial Sensitivity, E. coli.

INTRODUCTION

During pregnancy, urinary tract infections (UTIs) are one of the most prevalent bacterial illnesses. Untreated UTIs can lead to serious obstetric issues. UTIs are caused by the growth of microorganisms in the urinary system. They are the most common bacterial infection across all age groups, especially during pregnancy. It might affect both the lower urinary system or the bladder [1].

UTIs are the second most frequent pregnancy problem, behind anemia. If left untreated, they can harm both the newborn and the mother's health. When bacteria spreads to the kidneys, patients may feel back discomfort, chills, fever, nausea, and vomiting. Bacteria in the digestive system, vagina, or around the urethra can cause UTI [2]. They typically enter the urethra and move to the bladder and kidneys. Pregnant women are more vulnerable to urinary tract infections than males due to a shorter urethra, increased fecal flora contamination, and other factors [3].

Women are more likely to acquire UTIs during pregnancy due to anatomical, physiological, and hormonal changes. Untreated UTI during pregnancy can lead to serious consequences for both Mother and fetus. These issues can be mitigated via timely and correct evaluation and therapy, which also reduces the establishment of medication resistance. Resistance to antibiotics is a severe health risk in the treatment of urinary tract infections [4]. Antimicrobial resistance is a critical health concern in the treatment of urinary tract infections caused by Escherichia coli and Klebsiella pneumonia, which are the most frequent urinary tract pathogen in pregnant women. In Mulago National Referral Hospital, Uganda's major hospital, 96% of pregnant women with UTI received empirical treatment, with 18% having extended spectrum ß-lactamases (ESBL) and 36% having multidrug resistant Escherichia coli strains [5].

Susceptibility testing are frequently used to delay UTI treatment. The emergence of antibiotic-resistant strains between urinary pathogens has been increasing globally [6], and it has grown into an important global health problem, particularly in nations that are developing where high levels of poverty, a lack of understanding, weak hygiene standards, and a high prevalence of counterfeit as well as spurious drugs of dubious quality in distribution are all contributing variables [7,8].

Because antimicrobial resistance varies by area, it is critical to understand the distribution of urinary pathogens and how susceptible they are to antibiotics in a specific environment [9] to enable the most effective empirical therapy. Furthermore, antibiotic resistance is a dynamic process, which requires frequent surveillance and monitoring investigations [10].

METHODS:

Sample collection:

Urine samples 65 were collected from pregnant women in Anbar Governorate during the period from 10/1/2023 to 11/1/2023. All of the women were suffering from symptoms of urinary tract infection, and when performing a microscopic examination, the presence of urinary tract infection was confirmed. The study samples included age groups from 18-41. year. After obtaining samples of patients, they were brought to a laboratory for microscopic analysis.

Urine culture

Pipette a minimum of 5ul diluted urine sample into a sterile medium, distribute with a spreader, and grow at 37 °C for 24 hours. Gram-negative bacteria, specifically coliforms and Enterobacteriaceae, were isolated using CLED and MacConkey agar. Gram-positive bacteria were cultivated using chocolate plus blood agar. Bacteria were identified utilizing colony characteristics the organisms' gram stain response,

and biochemical assays. The culture of urine was conducted prior to microscopy to prevent contamination.

Antibiotic sensibility

Antibiotic susceptibility testing was carried out on Muller Hinton agar using the Kirby Bauer (disk diffusion) technique as per standard procedures [10]. The bacterial suspension was created by selecting a pure colony using a sterilized wire loop, suspending and emulsifying it in a test tube containing 5 ml of nutritious saline, and gently mixing it until it produced a homogenous suspension. Standard inoculums were adjusted with 0.5 McFarland, yielding a homogenous solution of 105-106 cells/mL. A sterile cotton swab was used to streak a sample back and forth across the whole surface of a dry Mueller-Hinton bacteria agar plate, and the inoculums were left to dry for 5-15 minutes with the lid on. The selected antibiotic disks were then placed to the plates with sterile forceps. The antimicrobial agents utilized for susceptibility examination were: The antimicrobial agents utilized for susceptibility examination were: ciprofloxacin (CIP), norfloxacin (NOR), ceftriaxone (CRO), ampicillin (AMP), Meropenem (MEM), Nitrofurantoin (TID).

Statically analysis

Mean plus standard deviation (SD) with median (by Graph Pad Prism). The percentage of research participants overall that had positive urine cultures was shown for each individual.

RESULTS

The proportion of culture-positive urinary tract infections was 92% (60 of 65). In the present study, four different bacteria were found; the one with the most prevalent Gram-negative isolate had been E. coli (88.3%), then Proteus mirabilis (1.6%). Gram-positive bacteria were found to include Streptococcus (3.3%) and Staphylococcus aureus (6.6%).as table (1), fig (1).

Results	Frequency(N)	Percent %
E. coli	53	88.3
Staphylococcus aureus	4	6.6
Proteus mirabilis	1	1.6
Streptococcus	2	3.3
culture-Negative UTI	5	7.6

Table1: *(Bacteriological assay result for UTI woman pregnant samples.)*

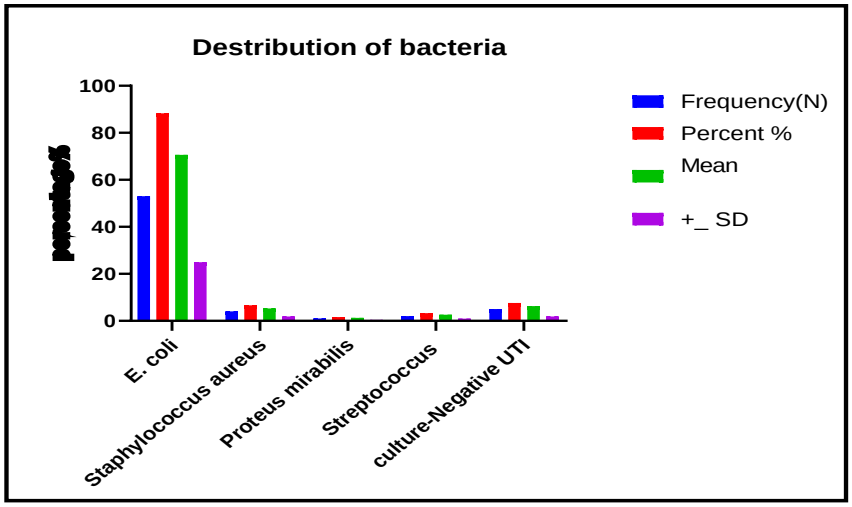
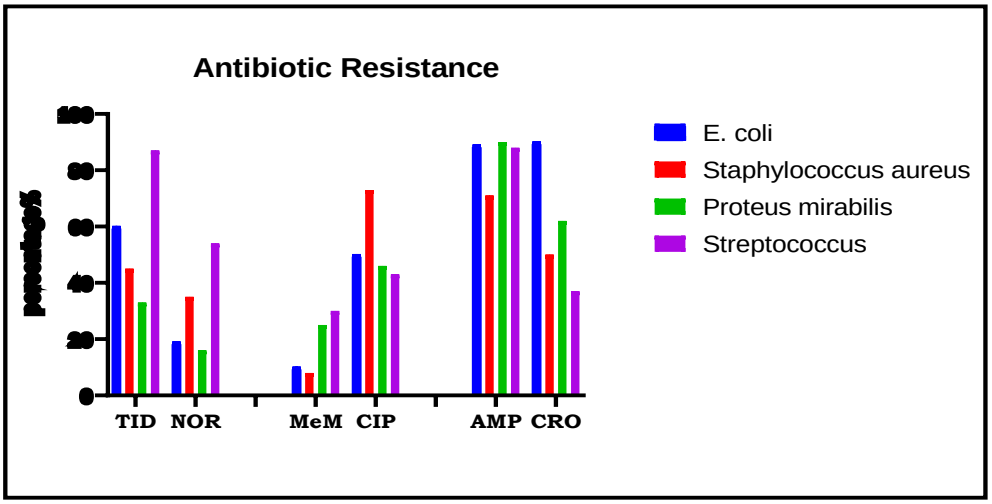


Figure.1 *(Distribution of Bacteria isolates from UTI woman patient.)*

Anti-Antibiotic resistance results show that the rate of resistance of E. coli to a ciprofloxacin (50%), norfloxacin (19%), ceftriaxone (90%), ampicillin (89%),Meropenem(10%),Nitrofurantoin (605), Staphylococcus aureus were resist to a ciprofloxacin (73%), norfloxacin (35%), ceftriaxone (50%), ampicillin (71%),Meropenem(8%),Nitrofurantoin (45%).while Proteus mirabilis resestance were for ciprofloxacin (46), norfloxacin (16), ceftriaxone (62%), ampicillin (90%),Meropenem(25%),Nitrofurantoin (33%).while Streptococcus appear resist to ciprofloxacin (43%), norfloxacin (54%), ceftriaxone (37%), ampicillin (88%),Meropenem(30%),Nitrofurantoin (87%).



Antibiotic susceptibility profiles of identified bacterial urinary tract pathogen from pregnant women's urine. ciprofloxacin (CIP), norfloxacin (NOR), ceftriaxone (CRO), ampicillin (AMP), Meropenem (MEM), Nitrofurantoin (TID).

DISCUSSION

Out of the 65 samples of urine that were examined, 60 of them showed significant bacterial growth when placed in culture, yielding a total prevalence of 92%. In the current study, Gram-negative bacteria

isolated from urinary tract infections were higher in percentage than others. Escherichia coli was more present in pregnant women, reaching 88%. Followed by Staphylococcus aureus the results of this study are consistent with Nahab [11] what he found, as he explained that isolate of E. coli was the most prevalent isolate (38.1%) found in pregnant women with UTIs, followed by Staphylococcus aureus (20%). Also, these findings are consistent with the findings of a research done by Al-nasrawi A [12], who discovered that E. coli is the uropathies that causes UTI. This study supported reports of females with UTI in other Iraqi cities, such as Al-Mosul [13], Baghdad [14], and other countries, such as the United States [15] and Ethiopia [16].

Staphylococcus species is an opportunistic pathogen that causes infection or sickness when bacterial strains cross from the epidermis to the urinary system [17]. S. aureus is a pathogen because it has various virulence factors, including as protein A, toxins, and, in some strains, microcapsules, which allow it to adhere to host tissue and cause UTI [16,18]. Actually, the trend varies depending on the location and time period, but the majority of global research indicates that E. coli was the most common bacteria that causes UTIs during pregnancy or in hospitals.

Because UTI is a common illness in women, its diagnosis and treatment have a substantial impact on patient health, healthcare costs, and the development of antibiotic resistance [19]. Prevalence studies on local UTI pathogens and their susceptibility patterns to antimicrobial medications are regarded to be significant in directing empirical antibiotic therapy since uropathogen prevalence and features may vary with time and geographical location [20]. As a result, the current study examined the distribution and antibiotic susceptibility of bacterial uropathogens in patients with UTIs. In keeping with previous studies, we observed that Gram-negative bacteria were more common than others [21,22].

Antibiotics are routinely used to treat urinary tract infections. Through the results of the susceptibility test, it appeared that most of the bacterial isolates isolated from pregnant women were resistant to the antibiotics used in this study, as they were more resistant to ampicillin, followed by Nitrofurantoin ceftriaxone, and ciproflaxin, and the results of our study are consistent with some other studies as undertaken in Dessie, North-East Ethiopia, it was discovered that the most common infections were caused by E. Coli, the pseudomonas and proteus species, with the E. Coli essentially resistant to ampicillin as well as nitrofurantoin [23].

Clinicians now have extremely limited options when it comes to treating UTIs due to the growing antimicrobial resistance of uropathogens to routinely used medicines [24]. Because the frequency and resistance pattern of bacteria to different antibiotics vary across time and region, we advise doing local investigations and prevalence rather than adhering to global standards for the experimental application of antibiotics in pregnant or clinical practice.

CONCLUSION

Gram-negative bacteria accounted for the majority of urinary tract infections that were found, with E. coli being the most frequently isolated kind. Most of the isolates exhibited resistance to ciprofloxacin, nitrofurantoin, and ampicillin. On the other hand, there was a notable incidence of sensitive to Meropenem and norfloxacin. To reduce the incidence of UTI as well as antibiotic resistant bacteria during pregnancy, urine cultures must be performed often and continuously for investigation and diagnosis.

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