

Study of Asymptomatic Bacteriuria and Urinary Tract Infections in Pregnant Women

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Abstract:

Background: One of the most frequent illnesses during pregnancy is urinary tract infections (UTI). These may result in major difficulties for the mother and the fetus if left untreated. The purpose of this study was to identify prevalent uropathogens that cause UTIs and to ascertain the prevalence of UTI in pregnant women.

Methods: 180 pregnant women provided midstream urine sample. The samples were analyzed both by culturing and under a microscope. A urinary tract infection is diagnosed in patients who have a colony count of 105 CFU/ml of urine of a single uropathogenic bacterium in culture, regardless of whether they are symptomatic or not.

Results: Thirty-three females (18.33%) with asymptomatic urine specimens had considerable development of uropathogenic organisms, supporting the diagnosis of UTI. After E. Coli (54.55%), Klebsiella species (24.24%), S. aureus (12.12%), Pseudomonas spp., Pseudomonas aeruginosa, and C. albicans (3.03% each) were the most frequently isolated pathogens.

Conclusion: According to this study, 18.33% of pregnant women had a UTI. Since the majority of these instances show no symptoms at all, it is critical to screen for it early using the right laboratory testing. This will assist medical professionals in initiating the proper antibiotic treatment at an early stage, hence reducing the difficulties associated with urinary tract infections.

Keywords: Urinary Tract Infections, Asymptomatic Bacteriuria, Pregnancy, Cystitis, Pyelonephritis.

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Introduction

Pregnancy is a typical time for urinary tract infections (UTI), which can manifest as cystitis or, less frequently, as pyelonephritis. [1] Pregnant women who experience a symptomatic or asymptomatic UTI account for about 20% of cases. [1] Anatomical problems, notably the urethra's close closeness to the anus, greatly increase the risk of UTI in women.

Due to physiological changes including lower urine concentration caused by increased plasma volume, which promotes bacterial growth, pregnant women are significantly more vulnerable to UTIs. [2] Urinary stasis and the risk of UTI can be caused by certain anatomical changes, including as dilatation of the urethra and decreased bladder tone, which occur in 90% of pregnant women. [2]

Pregnant women who get UTIs may or may not exhibit associated symptoms. Asymptomatic bacteriuria and symptomatic UTI are the terms used to describe these two clinical forms of UTI. Asymp-

tomatic bacteriuria is defined as the presence of substantial bacteriuria without any symptoms that would indicate an acute urinary tract infection. [3] The development of 105 colony forming units (CFUs) of a single uropathogenic bacterium in one milliliter of correctly collected urine specimens is one of the diagnostic criteria for severe bacteriuria. [4] If a patient has more than 105 uropathogenic organisms per milliliter of urine and is asymptomatic, this is regarded as a case of UTI. [5]

When more than 103 organisms per milliliter of urine and more than five pus cells are found in a urine wet mount per high power field (HPF) of a microscope in a patient exhibiting symptoms suggestive of a urinary tract infection (UTI), the condition is deemed confirmed. [5] Based on anatomy, these illnesses are classified as upper urinary tract (pyelonephritis) or lower urinary tract (cystitis).

The sixth week is when the risk of a UTI starts, and the 22–24 week period is when it peaks. [2] In cer-

tain cases, hospitalization is necessary for the patient's UTI therapy. Untreated urinary tract infection (UTI) or asymptomatic bacteriuria during pregnancy can have serious effects on both the mother and the fetus.

These can include an increased risk of pyelonephritis, sepsis, and temporary renal failure, as well as more complex outcomes like intrauterine growth retardation, pregnancy-related hypertension, and premature birth. [2] In order to reduce difficulties related to UTI, it is crucial to screen, raise suspicions, and recognize this condition with the intention of starting suitable therapy as soon as possible. In light of this, a tertiary care rural hospital hosted a study to determine the frequency of urinary tract infections among antenatal clinic (ANC)-attending pregnant women. Standard microbiological techniques were employed to identify the isolated uropathogens.

Material and Methods

This study was a prospective study carried out in the Department of Microbiology, Radha Devi Jageshwari Memorial Medical College & Hospital, Turki, Muzaffarpur, Bihar, from January 2023 to June 2023. 180 pregnant patients, ages 18 to 45, who visited their urine samples tested. Participants in the study were excluded if they had a known renal illness or urinary tract abnormality, or if they were receiving antibiotic therapy for any reason within 72 hours of the specimen collection. After being given the necessary instructions to reduce the possibility of contamination, the patients were

instructed to collect a midstream urine specimen in a sterile wide mouth container. The American College of Obstetrics and Gynecology (ACOG) recommends collecting the samples at the first prenatal visit. [6] You should reject the first portion of pee that clears the anterior urethra of commensal bacteria. The midstream sample, or next section of pee, is collected in a sterile wide-mouthed container. Urine that is turbid or hazy is examined grossly. When bacteria, proteins, crystals, or leucocytes are present, this is observed.

Using a semi-quantitative approach, uncentrifuged urine samples are cultivated on blood agar and MacConkey agar. Without heating the specimen intermittently, 0.001 milliliters of a typical inoculating loop are streaked over culture plates. Culture plates are kept at 37°C for a whole day, and the following day, the growth of bacteria is monitored. Standard microbiological methods including motility, Gram staining, colony features, and biochemical reactions were used to identify these isolates.

Results

Thirty-three urine specimens from the 180 pregnant women whose specimens were evaluated had uropathogenic organism growth that met the criteria (10⁵ CFU/ml of urine), as indicated in Table 1. These women had no complaints about any UTI-related symptoms, suggesting that their bacteriuria cases were substantial despite their lack of symptoms.

Table 1: Number of examined samples and culture confirmed cases.

No. of specimens examined	Culture Confirmed cases of UTI	Percentage
180	33	18.33%

Of the 33 urinary pathogens that were recovered, E. Col. accounted for the majority (18 isolates), with Klebsiella species coming in second (8 isolates). The percentage of various identified organisms and the total number of urine pathogens isolated from these cases are displayed in Table 2.

Table 2: Number of different urinary pathogens isolated and these percentage.

Organism isolated	No. of isolates	Percentage
E.coli	18	54.55%
Klebsiella spp.	8	24.24%
Staphylococcus aureus	4	12.12%
Pseudomonas spp	1	3.03%
Pseudomonas aeruginosa	1	3.03%
Candida albicans	1	3.03%
Total	33	100.0%

E. coli accounted for 54.55% of all pathogens identified from cases of UTI in pregnancy in our study, with Klebsiella species coming in second (24.24%). The percentage of various isolated species is displayed in Table 3.

Discussion

While urinary tract infections are frequent in both sexes, women are more likely to get them than

males because of anatomical and physiological differences. It is a disorder that women will undoubtedly experience at some point in their lives, and the prevalence is higher in pregnant women. [5] Pregnancy-related UTI risk starts in the sixth week. Its occurrence peaks in the 22nd and 24th week.

Ninety percent of pregnant women experience pregnancy-related dilation of the ureters, which

lasts until delivery (hydronephrosis). Urine retention and vesicoureteral reflux are caused by a number of factors, including an enlarged uterus, a decrease in the tone of the bladder and ureter muscles, and an increase in bladder volume. Additionally, a drop in urine concentration is caused by an increase in plasma volume. Glycosuria, or abnormal glucose metabolism, affects about 70% of expectant mothers and promotes bacterial growth and survival in the urine. An increase in progestins and estrogens in the urine reduces the urinary tract's ability to fight against infection locally. Pregnancy-related UTIs may arise as a result of any of these variables. [9] These infections can have major effects on the mother and fetus if they are not detected and treated in a timely manner. It is feasible to prevent future difficulties for both mother and fetus from untreated urinary tract infections (UTIs) by rapidly treating pregnant women who exhibit symptoms or no symptoms at all. Thirty-three urine specimens from the 180 cases studied in this investigation demonstrated uropathogenic organism growth that was substantial, indicating a urinary tract infection. Therefore, 18.33% of pregnant women had a UTI. It was discovered that 49.4% of pregnant women had UTIs in a related study by Parida B. et al. [10] in a different study conducted by Haider G. et al. [11], only 4.3% of pregnant women had a UTI. According to Parveen K. et al. [1], 26% of pregnant women get UTIs. *E. coli* accounted for 54.55% of all uropathogens identified from cases of UTI in pregnancy in our study, making it the most frequent pathogen, followed by *Klebsiella* species (24.24%). This result was in line with a study by Parveen K. et al. [1], which found that *Klebsiella* spp. (7.69%) was the most often isolated urinary pathogen, followed by *E. coli* (86.15%). *E. coli* was found to be the most frequently isolated bacterium from UTI in pregnant females (81.2%), followed by *Klebsiella* (12.8%) according to Ordaz-Lopez VI et al [12]. Valentina Y. et al. [13] found that *Enterococcus* was the most prevalent pathogen in UTI cases among pregnant women, which contradicts this finding.

Conclusion

Although urinary tract infections are extremely common in both men and women, they are more common in women, particularly during pregnancy. This is because female urinary tracts differ anatomically from male urinary tracts, and pregnancy also brings with it physiological and hormonal changes. Pregnancy-related UTIs can have major effects on both the mother and the fetus, including an increased risk of pyelonephritis, sepsis, and temporary renal failure, as well as more complex complications such as preeclampsia, intrauterine growth retardation, and preterm

delivery. In order to reduce difficulties related to UTI, it is crucial to screen, raise suspicions, and recognize this condition with the intention of starting suitable therapy as soon as possible.

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