

Original Research

Study On Asymptomatic Bacteriuria Among Pregnant Women

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Abstract

Background: Asymptomatic bacteriuria refers to the presence of bacteria in urine. It is a condition in which urine culture reveals a significant growth of pathogens that is greater than 10^5 bacteria/ml, but without the patient showing symptoms of urinary tract infection (UTI). This is common during pregnancy. The apparent reduction in immunity of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms

Methodology: clean-catch mid-stream urine was collected from each patient into sterile vacutainer container. Samples were cultured on dried plates of blood agar and cysteine lactose electrolyte deficient agar (CLED) using a calibrated drop delivering 0.002ml of urine. Plates were incubated aerobically at 37°C overnight. Colony counts yielding bacterial growth of 10^5 /ml or more of pure isolates were regarded as significant for infection.

Results: Out of 1000 pregnant women examined for asymptomatic bacteriuria, 411 pregnant women were positive for significant bacteriuria giving a prevalence of 41.1%. Out of the 411-culture positive, 360 (87.5%) yielded single bacterial isolates while 51 (12.04%) yielded mixed bacterial isolates. The most prevalent organism observed in this study was *Escherichia coli* (21.8%), followed by *Staphylococcus aureus* (18.9%), *Klebsiella* species (11.6%), *Proteus* species (12.4%), *Citrobacter* species (6.8%), *Providencia* species (8.27%), *Pseudomonas aeruginosa* (6.81%) and *Candida albicans* (12.6%).

Discussion and Conclusion: This study revealed 41.1% prevalence of asymptomatic bacteriuria among pregnant women. This is worrisome because UTI in pregnancy may have serious consequences for both the mother and the child. The most predominant organisms were *Escherichia coli* and *Staphylococcus aureus*. Ciprofloxacin, Ceftriaxone and Augmentin were very effective against most of the urinary isolates. Routine urine culture test should be carried out on all antenatal women to detect asymptomatic bacteriuria.

Key-words: asymptomatic bacteriuria, urinary tract infection, clean-catch mid-stream urine, pregnant women, *Escherichia coli* and *Staphylococcus aureus*.

INTRODUCTION:

Asymptomatic bacteriuria refers to the presence of bacteria in urine. It is a condition in which urine culture reveals a significant growth of pathogens that is greater than 10^5 bacteria/ml, but without the patient showing symptoms of urinary tract infection (UTI) [1]. This is common during pregnancy. The apparent reduction in immunity of pregnant women appears to encourage the growth of both

commensal and non-commensal microorganisms [2]. The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosuria, which encourages bacterial growth in the urine [3,4]. Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria which could lead to pyelonephritis and adverse obstetric outcomes such as prematurity, low birth weight [5] and higher foetal mortality rates [6,7]. The adverse effects of undiagnosed asymptomatic bacteriuria on mother and child have made researchers to suggest routine culture screening for all pregnant women attending antenatal clinic [8-10] in order to prevent mother and child from any form of complication that may arise due to infection.

Researchers suggest a regular culture screening for all pregnant women presenting themselves to antenatal clinics due to the adverse effects of undiagnosed ASB in the mother and child [11] and also to prevent the mother and newborn child from any further complications likely to occur due to infection. Culturing still is the best standard screening technique for identifying ASB. However, in many countries including India and other developing countries, it is uncommon to conduct a routine urine culture test for antenatal patients [12]. The primary reason for this practice being the time factor for culture results and the cost involved (usually a period of 48 h is needed for culture result), it is instead normal practice to go for the strip urinalysis for finding the presence of glucose and protein content [13].

Globally, the existence of ASB has been reported to be between 2–10% [14]. But various studies show prevalence higher than this, such as 25.3% in Odisha [15], 17% in Andhra Pradesh [16] and 17% in Lucknow [8]. Pyuria is one of the urinary tract conditions that are common during pregnancy, and it is considered when the midstream urine specimen has 5 and more WBC count occurring per cubic millimetre [18]. According to studies based on the population record, this is a predominantly existing condition and is found that 13.9% of women and 2.6% of men are being affected [19].

However, in many hospitals in our country routine urine culture test is not carried out for antenatal patients probably due to cost implication and time factor for culture result instead many clinicians opt for the strip urinalysis method for assessing urine in pregnant women. The true picture of such urine specimen cannot be fully assessed as the strip cannot quantify the extent of infection in such a patient as well as provide antimicrobial therapy which is usually seen in the case of culture test. In many health centers in developing countries, the attention of clinicians and health care providers is usually on the presence of glucose and protein in urine specimens with less attention on possible asymptomatic infection. Against this background, this work is aimed at determining asymptomatic bacteriuria among pregnant women attending antenatal clinic at our hospital.

AIM AND OBJECTIVES OF THE STUDY:

The objective of our study is to find out the prevalence of asymptomatic bacteriuria among pregnant women attending our hospital for routine ante natal check-ups.

METHODOLOGY:

Site: This present study was conducted at National Institute of Medical Sciences, Jaipur, Rajasthan.

Study population: We included a total of 1000 pregnant women who have no clinical signs and symptoms of UTI.

Study design: prospective observational study.

Sample size: we included a total of 1000 pregnant women.

Inclusion and exclusion criteria: we included a total of 1000 pregnant women attending routine antenatal clinic for the routine check-up who were willing to give voluntary consent. We excluded the pregnant women with signs and symptoms of UTI and antibiotic usage within one week.

Specimen collection: clean-catch mid-stream urine was collected from each patient into sterile vacutainer container. Samples were cultured on dried plates of blood agar and cysteine lactose electrolyte deficient agar (CLED) using a calibrated drop delivering 0.002ml of urine. Plates were incubated aerobically of 37°C overnight. Colony counts yielding bacterial growth of 10⁵/ml or more of pure isolates were regarded as significant for infection. Similarly, 10ml of each patient urine was transferred into sterile centrifuge tubes and then centrifuged at 3000rpm for 10-15 minutes. The supernatant was discarded and the deposit examined microscopically at high magnification for pus cells, red blood cells, epithelial cells, casts, crystals, yeast-like cells and Trichomonas vaginalis. Pus cells > 5 per high power field were also considered significant for infection. The isolated organisms from culture plates were identified by standard laboratory techniques. Antimicrobial in-vitro susceptibility testing was performed using agar disc diffusion method. The National Committee for Clinical Laboratory Standard (NCCLS) operating procedure was followed. **Statistical Analysis:** Statistical analysis was performed by the chi-square (χ^2) test. A P-value of < 0.05 was deemed statistically significant.

RESULTS:

Out of 1000 pregnant women examined for asymptomatic bacteriuria, 411 pregnant women were positive for significant bacteriuria giving a prevalence of 41.1%. Out of the 411 culture positive, 360 (87.5%) yielded single bacterial isolates while 51 (12.04%) yielded mixed bacterial isolates.

| Age group (years) | Number of patients | No infection | Infection present |
|-------------------|--------------------|--------------|-------------------|
| 15-20 | 106 | 66 | 40 |
| 21-25 | 230 | 120 | 110 |
| 26-30 | 344 | 195 | 149 |
| 31-35 | 260 | 180 | 80 |
| 36-40 | 60 | 28 | 32 |
| Total | 1000 | 589 | 411 |

| Organism | Number of patients | Prevalence |
|------------------------|--------------------|------------|
| Escherichia coli | 90 | 21.8 |
| Staphylococcus aureus | 78 | 18.9 |
| Klebsiella species | 48 | 11.6 |
| Proteus species | 51 | 12.4 |
| Citrobacter species | 28 | 6.8 |
| Providencia species | 34 | 8.27 |
| Pseudomonas aeruginosa | 28 | 6.81 |
| Candida albicans | 52 | 12.6 |

DISCUSSION:

In the present study, we included a total of 1000 pregnant women attending our antenatal clinic. Out of 1000 pregnant women examined for asymptomatic bacteriuria, 411 pregnant women were positive for significant bacteriuria giving a prevalence of 41.1%. Out of the 411 culture positive, 360 (87.5%) yielded single bacterial isolates while 51 (12.04%) yielded mixed bacterial isolates.

The most prevalence organism observed in this study was *Escherichia coli* (21.8%), followed by *Staphylococcus aureus* (18.9%), *Klebsiella* species (11.6%), *Proteus* species (12.4%), *Citrobacter* species (6.8%), *Providencia* species (8.27%), *Pseudomonas aeruginosa* (6.81%) and *candida albicans* (12.6%). This finding agrees with earlier reports who observed the same predominant trend in *Escherichia coli* infection pattern. This could be due to the fact that urinary stasis is common in pregnancy and since most *Escherichia coli* strains prefer that environment, they cause UTI. Another reason could be as a result of poor genital hygienic practices by pregnant women who may find it difficult to clean their anus properly after defecating or clean their genital after passing urine. This study revealed that Ciprofloxacin, Ceftriaxone and Augmentin were very effective against most of the urinary isolates. Gentamicin and Nitrofurantom were moderately effective against the urinary isolates. Ampicillin, Cloxacillin and Erythromycin were highly resistant to the isolates. The findings of our study are in agreement with previous studies [10-18].

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