

# EVALUATION OF ASYMPTOMATIC BACTERIURIA IN ANTENATAL WOMEN AT CU SHAH MEDICAL COLLEGE & HOSPITAL, SURENDRANAGAR, GUJARAT

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## ABSTRACT

**Background:** Asymptomatic bacteriuria (ASB) refers to the presence of a bacterial isolate in urine culture in an asymptomatic person. Pregnant women with ASB are more likely to develop acute pyelonephritis in later pregnancy, postpartum urinary tract infection, hypertensive disease of pregnancy, anaemia, chronic renal failure, prematurity, low birth weight babies and prenatal death if untreated. The incidence of these can be reduced by treating ASB during pregnancy.

**Aims & Objective:** To study the incidence of asymptomatic Bacteriuria in pregnancy.

**Material and Methods:** Approximate 20 ml of clean catch midstream urine samples were obtained from 100 pregnant women attending the Obstetric Outpatient Department. Samples were processed as per standard guidelines.

**Results:** Microscopic analysis of urine showed pus cells in 5 (45.45%) and Gram's stain smear showed bacteria in 9 (81.81%). Urine culture showed ASB in 11 (11%) pregnant women. Escherichia coli were found in 6 (54.55%), Klebsiella pneumoniae 3 (27.27%), Enterococcus sp. in 1 (9.09%) and Staphylococcus aureus in 1 (9.09%). Antibiotic sensitivity testing showed that all isolates were sensitive to all the antibiotics.

**Conclusion:** Incidence of asymptomatic bacteriuria was 11% in 100 pregnant women. Microscopic analysis of all 11 urine culture positive samples showed pus cells in 5 (45.45%) and Gram's stain smear showed bacteria in 9 (81.81%). The most common bacterial isolate was Escherichia coli (54.54%), followed by Klebsiella pneumoniae (27.27%), Staphylococcus aureus (9.09%) and Enterococcus sp. (9.09%). Urine culture is necessary for screening pregnant women.

**Key-Words:** Asymptomatic Bacteriuria (ASB); Urinary Tract Infection (UTI); Pregnancy

## Introduction

Infection of the urinary tract is a common problem in pregnancy due to the morphological and physiological changes that takes place in the genitourinary tract. It may be of two types, symptomatic or asymptomatic.<sup>[1]</sup> Asymptomatic bacteriuria (ASB) may be defined as the "presence of actively multiplying bacteria within the urinary tract excluding the distal urethra", at a time when the patient has no urinary symptoms. Or which may be defined as asymptomatic bacteriuria was defined as the presence of  $\geq 1 \times 10^5$  colony forming unit (CFU) per ml in a culture of clean voided midstream urine from an antenatal women without fever or symptoms of UTI.<sup>[1]</sup>

Pregnancy causes numerous changes in the body of a woman. Hormonal and mechanical changes increase the risk of urinary stasis and

vesicouretral reflex. These changes, along with an already short urethra (approximately 3-4 cm in females) and difficulty with hygiene due to a distended pregnant belly, increase the frequency of urinary tract infections (UTIs) in pregnant women.<sup>[2]</sup> The smooth muscle relaxation and subsequent ureteral dilatation that accompany pregnancy facilitate the ascent of bacteria from the bladder to the kidneys.<sup>[3]</sup>

Pregnant women with ASB are more likely to develop acute pyelonephritis in later pregnancy, postpartum urinary tract infection, hypertensive disease of pregnancy, anemia, chronic renal failure, prematurity, low birth weight babies and prenatal death if untreated. Therefore, if causative bacteria are detected in urine, pregnant women will be treated even if symptoms are not present.<sup>[2]</sup> This study was performed to know the incidence of asymptomatic bacteriuria in pregnant

women and microbiological assessment of the causative agents.

Aims and objectives of this study were,

- To study the incidence of asymptomatic Bacteriuria in pregnancy
- To study the bacterial pathogen responsible for ASB
- To study the Antibiotic sensitivity pattern for ASB.

## Materials and Methods

This study was conducted during December 2010 to March 2011. This study was undertaken with due permission of Institutional Ethics Committee (Human Research).

**Specimen Collection:** Urine samples were collected in sterile wide mouth 50 ml capacity container. Instruction for collection of the urine was explained to women. Approximate 20 ml of clean catch midstream urine samples were obtained from 100 pregnant women, attending the Obstetric Outpatient Department of CU Shah medical college, Surendranagar. After collection it was immediately transported to the Microbiology Department and processed within 1 hour. In case of delay, the samples were refrigerated.

**Isolation and Identification:** The urine specimens were first processed by semi-quantitative culture method and then tested by the screening methods Gram' stains and wet mount. A semi-quantitative calibrated loop technique was used for the primary isolation of the bacterial isolates. A loopful of well-mixed, uncentrifuged urine was streaked on to the surface of Blood agar and MacConkey agar. After incubating aerobically for 24 hours at 37°C, colony forming unit (CFU) per ml of urine was calculated. Colony count  $>1 \times 10^5$  colony forming unit (CFU) per ml in a culture is known as significant bacterial isolates. They were identified as per standard guidelines.<sup>[5]</sup>

**Gram's Stain:** A drop of uncentrifuged, well mixed urine was taken on a clean grease-free slide and stained by Gram's staining and examined under the oil immersion objective of the microscope (examining 20 fields). Presence of  $\geq 1$  bacteria per

oil immersion field correlates with significant bacteriuria of  $\geq 10^5$  CFU/ml of urine.

**Wet Mount:** Counting of pus cells in the uncentrifuged urine was performed by using slide micrometry method (a value of 10 cells/cu mm or more corresponds to pyuria) which signifies the presence of UTI.

**Antibiogram of Isolates:** A suspension was prepared from single isolated colony of which turbidity was compared with 0.5 McFarland standard. A swab was dipped in suspension and streaked over surface of a Mueller-Hinton agar. Antibiotic disks of Cephalexin (30 $\mu$ g), Cefotaxime (30 $\mu$ g), Gentamycin (10 $\mu$ g), Amikacin (30 $\mu$ g), Nalidixic acid (30 $\mu$ g), Trimethoprim-sulfamethaxazole (25 $\mu$ g), Ampicillin-sulbactam (20 $\mu$ g), Amoxicillin (10 $\mu$ g), Norfloxacin (10 $\mu$ g), and Nitrofurantoin (300 $\mu$ g) were used. Zones of inhibition were measured and isolates were considered as susceptible, intermediate susceptible and resistant as per the zone inhibition diameter as recommended by the Clinical and Laboratory Standards Institute (CLSI) guidelines.<sup>[5]</sup>

## Results

Total of 100 pregnant women were included in this study. Microscopic analysis of urine showed pus cells in 5 (45.45%) and Gram's stain smear showed bacteria in 9 (81.81%). Bacteriological examination revealed asymptomatic bacteriuria in 11 (11%) pregnant women. Escherichia coli was the most common isolate 6 (54.54%), followed by other uropathogens such as Klebsiella pneumoniae 3 (27.27%), Staphylococcus aureus in 1 (9.09%), Enterococcus sp.1 (9.09%) (As shown in Table 1). 2<sup>nd</sup> Trimester constitute a higher rate of incidence of infection (As shown in Table 2). Para-2 women have a higher rate of acquiring infection (As shown in Table 3). Antibiotic sensitivity testing showed that all isolates were sensitive to all the antibiotics used.

**Table-1: Distribution of Organisms**

Organism	Number	Percentage
Escherichia coli	6	54.55%
Klebsiella pneumoniae	3	27.27%
Staphylococcus aureus	1	9.09%
Enterococcus spp.	1	9.09%
Total	11	100%

**Table-2: Bacterial Isolates as per Trimester**

Trimester	Number	Positive Cases	Percentage
1 <sup>st</sup> Trimester	55	4	7.27%
2 <sup>nd</sup> Trimester	30	6	20%
3 <sup>rd</sup> Trimester	15	1	6.66%

**Table-3: Bacterial Isolates as per Parity**

Parity	Number	Positive Cases	Percentage
Para-1	65	5	7.69%
Para-2	25	5	20%
Para-3	10	1	10.00%

## Discussion

Various other studies shows an incidence varying from 4% to 23.9%.<sup>[7]</sup> The incidences of 11% in the present study is very similar to that of the other authors (As shown in Table 4). In present study *Escherichia coli* was the most common organism isolated, followed by *Klebsiella sp.* and *Staphylococcus aureus* which is very similar to Lavanya S.V et al.<sup>[6]</sup> Present study found higher incidence in 2<sup>nd</sup> Trimester.

Urinary tract is second only to the respiratory tract in acquiring microbial infection, especially in females. It is more common in pregnant than in non-pregnant women. Urinary tract infections result from ascending colonization of the urinary tract. The primary source of organisms is existing vaginal, perineal, and fecal flora.<sup>[3]</sup> Causative agents of asymptomatic bacteriuria in females are usually the commensal bacteria of the genital tract and of the bowel. Different determinants of virulence such as presence of adhesins, stasis produced by gravid uterus etc. play a role in the causation of UTI.<sup>[6]</sup>

Pregnant women are at increased risk for UTI (starting in week 6 through week 24), because uterus sits directly on top of the bladder and displaces it. Shift in the position of the urinary tract and hormonal changes during pregnancy make it easier for bacteria to travel up the urethras to the kidneys.<sup>[8]</sup>

**Table-4: Comparison of Bacterial Isolates by Culture Method of Asymptomatic Bacteriuria**

Study	N	Bacterial Isolates	%
Khattak AM et al <sup>[9]</sup>	290	18	6.20
Lavanya SV et al <sup>[6]</sup>	500	42	8.40
Present Study	100	11	11.00

## Conclusion

Incidence of asymptomatic bacteriuria was 11%

in 100 pregnant women. Microscopic analysis of all 11 urine culture positive samples showed pus cells in 5 (45.45%) and Gram's stain smear showed bacteria in 9 (81.81%). The most common bacterial isolate was *Escherichia coli* (54.54%), followed by *Klebsiella pneumoniae* (27.27%), *Staphylococcus aureus* (9.09%) and *Enterococcus sp.* (9.09%). Antibiotic sensitivity testing showed that all isolates were sensitive to all the antibiotics. The use of microscopic urine analysis was not a clinically effective alternative method of detecting asymptomatic bacteriuria, so urine culture is necessary for screening of ASB in pregnant women.<sup>[8]</sup> In pregnancy untreated ASB is a risk factor for acute cystitis (40%) and pyelonephritis (25-30%). ASB leads to preterm birth, perinatal mortality and low birth weight babies. So identification of ASB during pregnancy and its proper treatment is necessary.

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