

## ORIGINAL RESEARCH

# Analysis of Microbiological Profile of Asymptomatic Bacteriuria in Pregnancy at a Tertiary Care Hospital

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### ABSTRACT

**Background:** Asymptomatic bacteriuria (ASB) is defined as a pure culture of at least  $10^5$  organisms/ml of urine in the absence of symptoms. It is the most common bacterial infection requiring medical treatment in pregnancy. The present study was conducted for evaluating microbiological Profile of Asymptomatic Bacteriuria in Pregnancy. **Materials & Methods:** A total of 500 pregnant subjects were screened in the present study. Socio-demographic data were obtained. Clean-catch midstream urine was collected from each patient into a sterile universal container. Samples were cultured on dried plates of blood agar and cysteine lactose electrolyte deficient agar. Plates were incubated aerobically of  $37^\circ\text{C}$  overnight. Colony counts yielding bacterial growth of  $10^5$ /ml or more of pure isolates were regarded as significant for infection. The isolated organisms from culture plates were identified by standard laboratory techniques. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** A total of 300 subjects were analyzed. ABU was present in 33.33 percent of the subjects. The mean age of the subjects with ABU was 29.3 years. The majority of the subjects were of rural residence. *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella* species, *Proteus* species and *Pseudomonas aeruginosa* species were seen in 33 percent, 28 percent, 15 percent, 12 percent and 12 percent of the patients respectively. **Conclusion:** Significant proportion of pregnant subjects are affected with ABU. This is worrisome because UTI in pregnancy may have serious consequences for both the mother and the child.

**Key words:** Bacteriuria, Pregnancy, *Escherichia coli*, *Staphylococcus aureus*.

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### INTRODUCTION

Profound physiological and anatomic changes in the urinary tract during pregnancy contribute to the increased risk for infection. Asymptomatic bacteriuria (ASB) is defined as a pure culture of at least  $10^5$  organisms/ml of urine in the absence of symptoms. It is the most common bacterial infection requiring medical treatment in pregnancy. A prevalence of 2 -10 per cent has been reported.<sup>1, 2</sup> Maternal and foetal complications attributed to it are symptomatic urinary tract infection (UTI), pyelonephritis, preeclamptic toxemia (PET), anaemia, low birth weight (LBW),

intrauterine growth retardation (IUGR), preterm labour (PTL), preterm premature rupture of membrane (PPROM) and post-partum endometritis.<sup>3, 4</sup>

Asymptomatic bacteriuria is a urinary tract infection (without symptoms) common in pregnancy. If untreated, it can lead to pyelonephritis (kidney infection). Antibiotic treatment is recommended.

Untreated pyelonephritis is associated with 20/50% incidence of preterm birth. However, the direct effect of ABU on the child is not well established. An apparent association between ABU in pregnancy and preterm delivery/low birth weight (B/2500 g) has been

observed; however, there is doubt as to whether ABU is a separate risk factor or merely a marker for low socioeconomic status, which is associated with low birth weight.<sup>5-8</sup> Hence; the present study was conducted for evaluating microbiological Profile of Asymptomatic Bacteriuria in Pregnancy.

### MATERIAL AND METHODS

The present study was conducted for evaluating microbiological Profile of Asymptomatic Bacteriuria in Pregnancy. A total of 500 pregnant subjects were screened in the present study. Socio-demographic data were obtained. Clean-catch midstream urine was collected from each patient into a sterile universal container. Samples were cultured on dried plates of blood agar and cysteine lactose electrolyte deficient agar. 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. The isolated organisms from culture plates were identified by standard laboratory techniques. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

### RESULTS

A total of 300 subjects were analyzed. ABU was present in 33.33 percent of the subjects. The mean age of the subjects with ABU was 29.3 years. The majority of the subjects were of rural residence. *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella* species, *Proteus* species and *Pseudomonas aeruginosa* species were seen in 33 percent, 28 percent, 15 percent, 12 percent and 12 percent of the patients respectively.

**Table 1: Prevalence of ABU**

Variable	Number	Percentage
<b>ABU present</b>	100	33.33
<b>ABU absent</b>	200	66.67
<b>Total</b>	300	100

**Table 2: Microbiological profile**

Bacteria	Number	Percentage
<b>Escherichia coli</b>	33	33
<b>Staphylococcus aureus</b>	28	28
<b>Klebsiella species</b>	15	15
<b>Proteus species</b>	12	12
<b>Pseudomonas aeruginosa</b>	12	12
<b>Total</b>	100	100

### DISCUSSION

Asymptomatic bacteriuria (ABU) is the presence of bacteria in urine without symptoms of acute urinary tract infection. It is a common occurrence in both non pregnant and pregnant women. However, when it occurs in pregnant women anatomical and hormonal changes from the pregnancy leads to dilatation of the renal pelvis and ureters with an attendant urinary stasis. This combined with the short nature of the female urethra and perineal colonization by enteric organisms, predisposes pregnant women to the development of urinary tract infections and pyelonephritis. Urinary tract infections and pyelonephritis in pregnancy has been associated with morbidity for both the mother and foetus. It has been associated with pre-eclampsia, polyhydramnios, pre-term birth, low birth weight.<sup>7- 11</sup> Hence; the present study was conducted for evaluating microbiological Profile of Asymptomatic Bacteriuria in Pregnancy.

A total of 300 subjects were analyzed. ABU was present in 33.33 percent of the subjects. The mean age of the subjects with ABU was 29.3 years. The majority of the subjects were of rural residence. *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella* species, *Proteus* species and *Pseudomonas aeruginosa* species were seen in 33 percent, 28 percent, 15

percent, 12 percent and 12 percent of the patients respectively. Blomberg B et al, in a previous study, inoculated urine specimens from 5153 pregnant women. Bacterial isolates from 101 positive dip slides were identified and tested for susceptibility to antimicrobial agents by disc diffusion. In total, 107 bacterial isolates were recovered, 71 Gram-negative and 36 Gram-positive. The most frequent isolates were *Escherichia coli* (n=27) and enterococci (n=15). *E. coli* isolates showed low rates of resistance to ampicillin (17%), mecillinam (9%), cefalexin (0%), nitrofurantoin (4%), trimethoprim-sulfamethoxazole (0%), trimethoprim (13%) and sulfamethoxazole (0%). Other Gram-negative bacteria displayed higher rates of resistance to these drugs. All enterococcal isolates were sensitive to ampicillin and only 2 were resistant to nitrofurantoin. Growth of *E. coli* from urine culture was correlated with adverse outcome of pregnancy. Antimicrobial susceptibility prevails in urinary isolates of *E. coli* and enterococci from rural areas.<sup>10</sup> Chongsomchai C et al evaluated the diagnostic performance of a simple urinalysis as a screening test for asymptomatic bacteriuria (ABU) in pregnant women. Simple urinalysis and urine culture were performed on all 774 subjects. The presence of > or = 5 WBC/HPF of centrifuged urine indicated a

positive test. ABU was defined as the presence of  $>$  or  $= 10(5)$  colony forming units of single bacteria per milliliter of urine. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of simple urinalysis in detecting ABU, using urine culture as a gold standard were calculated. Simple urinalysis had a 18.4 per cent sensitivity, 97.2 per cent specificity, 45.7 per cent positive predictive value, 90.4 per cent negative predictive value and 88.4 per cent accuracy in detecting ABU. Because of its low sensitivity and the possible consequences of ABU, simple urinalysis should not be used as a screening test for ABU.<sup>11</sup>

Kovavisarach E et al determined the risk factors related to asymptomatic bacteriuria (ABU) in pregnant women. The prevalence of ABU in pregnant women was 10.0%. The significant risk factors related to ABU in pregnancy was lower education level  $<$  or  $=$  grade 6 ( $p < 0.05$ ) with 2.17-time risk of ABU compared with higher education level  $>$  grade 6. Maternal and gestational age, occupation, monthly income, gravidity, previous history of urinary tract infection and anemia were not statistically associated with ABU. Lower education level ( $<$  or  $=$  grade 6) should be the only significant risk factor related to ABU in Thai pregnant women under limited sample size.<sup>12</sup>

#### CONCLUSION

A significant proportion of pregnant subjects are affected with ABU. This is worrisome because UTI in pregnancy may have serious consequences for both the mother and the child.

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