

## Asymptomatic bacteriurea among pregnant women visiting Nepal Medical College Teaching Hospital, Kathmandu, Nepal

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### ABSTRACT

Urinary tract infection is the commonest bacterial infection in pregnancy. The overall incidence is 5.0-10.0% of all pregnancy. During pregnancy bacterial growth is favoured by increased urinary content of glucose, aminoacids and other nutrients. Other factors responsible for infection are basically related to hormonal effect and mechanical factors. Prolonged stasis of urine in urinary bladder favours growth of micro organism, relaxation of vesico-ureteric junction leads to reflux of urine from bladder to ureter and later up to renal pelvis and later can affect the renal parenchyma affecting the function of kidneys. In addition, some maternal defense mechanism are less effective during pregnancy. Bacteriuria either asymptomatic (5.0%) or symptomatic is common in pregnancy, if left untreated, asymptomatic bacteriuria will lead to acute pyelonephritis in 20.0-30.0%. This may result in abortion, premature delivery, low birth baby and even still birth. About 12.0% of antenatal admission are sepsis due to pyelonephritis. Keeping in mind that UTI in pregnancy leads to increase in maternal morbidity as well as neonatal morbidity and mortality. In this prospective study all asymptomatic consecutive antenatal women were included 200 from each trimester with total of 600 in number to see the incidence in different trimester, most prevalent organisms and it's sensitivity. They were followed up till delivery to see the incidence of asymptomatic bacteriurea in different trimester and its outcome in terms of type of delivery, baby weight, apgar score given at the time of birth and hospital admission for morbidity.

**Keywords:** UTI, pregnancy, fetal, bacteriurea, asymptomatic.

### INTRODUCTION

Urinary tract infection (UTI) is the commonest condition encountered by physicians. UTIs account for approximately 10 percent of OPD visits by women, and 15 percent of women will have a UTI at some time during their life. In pregnant women, the incidence of UTI can be as high as 8 percent.<sup>1</sup> Pregnant women are at increased risk for UTI. Beginning in week 6 and peaking during weeks 22 to 24, approximately 90 percent of pregnant women develop ureteral dilatation, which will remain until delivery (hydronephrosis of pregnancy). Increased bladder volume and decreased bladder tone, along with decreased ureteral tone, contribute to increased urinary stasis and ureterovesical reflux. Additionally pregnant women develop glycosuria, which encourages bacterial growth in the urine.<sup>1</sup> These multiple factors contribute to the development of UTIs during pregnancy. The organisms that cause UTIs during pregnancy are the same as those found in nonpregnant patients. *Escherichia coli* accounts for 80 to 90% of infections.<sup>2-4</sup> Other gram-negative rods such as *Proteus mirabilis* and *Klebsiella pneumoniae* are also common. In the 1960s, Kass<sup>6</sup> noted the subsequent increased risk of developing pyelonephritis in patients with asymptomatic bacteriuria.<sup>5</sup> Significant bacteriuria has

been historically defined as finding more than 10<sup>5</sup> colony-forming units per ml of urine.<sup>7</sup> Asymptomatic bacteriuria is common, with a prevalence of 10 percent during pregnancy.<sup>1-8</sup> Thus, routine screening for bacteriuria is advocated.

Untreated asymptomatic bacteriuria leads to the development of symptomatic cystitis in approximately 30 percent of patients and can lead to the development of pyelonephritis in up to 50 percent.<sup>5</sup> Asymptomatic bacteriuria is associated with an increased risk of intrauterine growth retardation and low-birth-weight infants.<sup>6,7</sup> The decision about how to screen asymptomatic women for bacteriuria is a balance between the cost of screening versus the sensitivity and

**Table-1:** Incidence of asymptomatic bacteriuria (ASB) according to trimester

Trimester	Number of Women	Cases of ASB Number	Percentage
First	200	30	15
Second	200	14	7
Third	200	15	7.5

This study showed higher incidence of ASB in first trimester in comparison to second and third trimester.

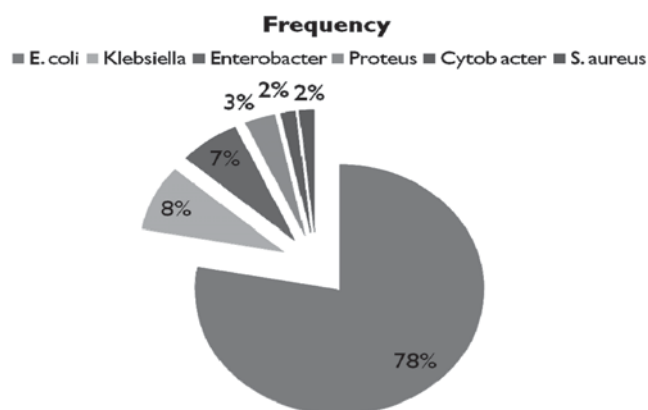
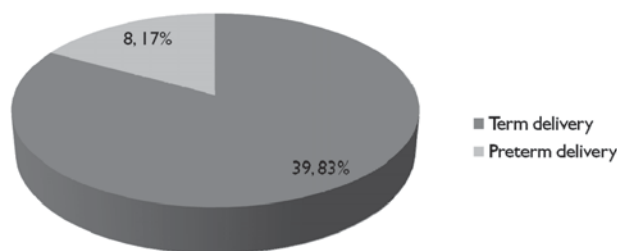


Fig. 1. Type of micro-organism isolated

specificity of each test. The gold standard for detection of bacteriuria is urine culture, but this test is costly and takes 24 to 48 hours to obtain results. The increased number of false negative and the relatively poor predictive value of a positive test make other faster methods less useful; therefore, a urine culture should be routinely obtained in pregnant women to screen for bacteriuria at the first prenatal visit and during the third trimester.<sup>8-10</sup>

## MATERIALS AND METHODS

1) With announcement of research proposal from research committee of Nepal medical college research committee, I with permission of head of department of Obstetrics and Gynecology applied for the grant. Since this study needs combined effort of Obstetricians and microbiologist, I had discussion with department of microbiology of NMCTH and they agreed to have active participation on the study. My proposal was selected for the grant and we decided to carry out the research. This study has objectives to find out the prevalence of asymptomatic bacteriuria (ASB) among pregnant women in three different trimester, commonest micro-organism, its sensitivity and pregnancy outcome. Women with no history of UTI in the previous days of this pregnancy, with history of urolithiasis, deranged renal function and any one who is taking antibiotics for any reason were excluded from study. Though this study was started from 2006, because of some technical reason there was some interruption so it was completed only on July 2011. With consent of the women enrolled in the study procedure was explained to the patients how to take mid stream urine. Patients were advised to come for follow up only to the allocated Doctor (principle investigator) if they any problem and were given contact number for consultation. At the end of each day urine sample were submitted to the lab. In lab routine calibrated loop was used with internal diameter of 4 mm which holds 0.01ml of urine



The incidence of pre-term birth among ASB was 17%. Out of 59 cases of ASB, 47 cases came for delivery in NMCTH.

Fig. 2. Type of delivery of ASB

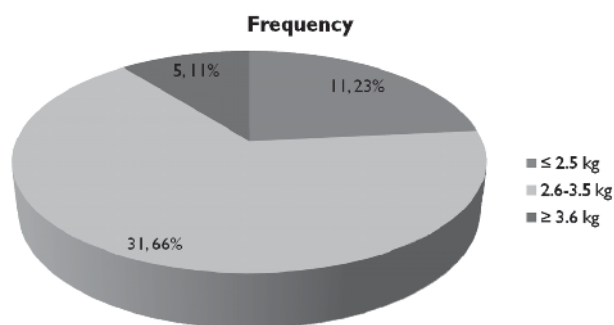
- 2) Blood agar and Mac Conkey agar were used as culture media
  - 3) Number of colonies counted and calculated in 1 ml.
  - 4) If the count is greater than 100000, It is taken as positive
- Reports were collected and delivered to the patient on next antenatal visit
  - All culture positive cases were treated with sensitive antimicrobial for 7 days
  - All culture positive women were followed till delivery and pregnancy outcome was recorded.

## RESULTS

Total number of women recruited in the study were 600, 200 from three different trimester. Inconclusive reports were excluded from the study like growth of multiple organisms (contaminated sample). Fifty nine cases had growth of different microorganism in urine, the prevalence of ASB being 9.8%. As shown in Table-1 in first trimester we had 30 cases of ASB out of 200 cases which comes to be 15%. In second and third trimester we got almost similar incidences about 7%, almost half of first trimester. In our study more than 50% of patients were Primigravida (Table-2) so incidence were found to be high among Primigravida than multigravida. The causative organism for ASB were analysed and found that E.coli found in 78% of cases followed by klebsiella and enterobacter (Fig-1), few cases were found with S. aureus, proteus and cytotobacter as well. Sensitivity test was carried out with those antimicrobial which were commonly seen sensitive and are found safer during pregnancy as much as possible. Gentamicin found the

Table-2 : Distribution of ASB according to Gravida

	Number	Percentage
Primi	36	61.02
Multi	17	28.81
Grand multi	6	10.17



Low birth weight was found in 11 cases. Among which 4 were admitted in neonatal intensive care unit ( severe sepsis-1, ARDS-2, convulsion-1).

Fig. 3. Weight of baby

most sensitive among all and Ampicillin was the least sensitive to the organism isolated in culture as shown in Table-3.

We tried to find out the relation of ASB with the mode of delivery and baby outcome. Out of 59 cases only 47 cases came for delivery in our Hospital so we tried to analyse among those only. The incidence of pre-term birth (17%) is much higher than general incidence of preterm delivery (Fig. 2). Same result was noted with weight of baby like we had 11% low birth weight as shown in Fig. 3. The admission in neonatal unit was 4 among 47 babies which comes to be the neonatal morbidity. Fortunately we did not have mortality among babies of ASB during hospital stay.

## DISCUSSION

The prevalence of asymptomatic bacteriuria in pregnancy in our study is 9.8%. Similar result was noted in a study done by Turpin with prevalence of 7.3%.<sup>11</sup> Other studies have shown different results like 9.8% by Tadesse,<sup>12</sup> 6.0% by Maclean,<sup>13</sup> 10.8% by Modarres,<sup>14</sup> 3.7% by Mobashegi<sup>15</sup> and as low as 3.3% by Ali.<sup>16</sup> Other studies conducted in India showed the incidence which varies from 4.0-23.9%.<sup>17</sup>

Table-3 : Sensitivity Pattern

Antimicrobial	Sensitive		Resistant	
	Number	Percentage	Number	Percentage
Gentamicin	49	83	10	16
Nitrofurantoin	46	77	12	20
Norfloxacin	39	66	18	30
Cephazolin	33	55	25	42
Ampicillin	6	10	52	88

Sensitivity test was carried out on the basis of previous reports. Commonly sensitivity antimicrobials were used with consideration of cost and effectiveness.

Similar study conducted by Lavanya *et al* showed the incidence being 8.4% with higher incidence among primigravida (66.0%) and low in grandmultigravida (16.0%)<sup>18</sup> which seems similar to our study as we have 61.0% in primigravida and 10.0% in grand multigravida as shown in Table-2.

The predominant organism found in urine of asymptomatic pregnant women is E. coli which is same as all other studies carried out in different parts of the world. As Delzell JE, Colgan R, Turpin, Hernandez, Hazhir Okonko and many more authors have published that E.Coli is the commonest organism causing ASB. Other organisms found are klebsella, enterobacter, proteus and other in decreasing order. As Lavanya *et al* showed exactly the same result.<sup>18</sup> One similar study conducted in Patan Hospital Kathmandu, Nepal by Sarma *et al* also showed the predominant organisms being E. coli in pregnant ladies with pyelonephritis and majority were sensitive to Nitrofurantoin.<sup>19</sup>

Sensitivity test was carried out on the basis of past experiences with type of organism and its sensitivity.

Gentamicin was found sensitive in 83.0% of cases which is almost same as study by Schieve *et al* showing 70.0% with ampicillin being least sensitive.<sup>8,17</sup> As we followed our patients till their delivery to find out the type of delivery and its outcome. Among 59 cases of culture proven ASB, only 49 cases came for delivery in our hospital. Among those who came for delivery 83.0% had delivery at term and 17.0% had delivery before term. To find out the effect of ASB on baby outcome we analysed the apgar score at birth and baby weight. In our study we got 23.0% of baby with ASB with low birth weight. Fortunately we did not see any case of neonatal death. On conclusion we found that the incidence of preterm delivery and low birth were more in comparison to those without ASB.<sup>9,20</sup>

## RECOMMENDATION

Urine culture is mandatory at least once in each trimester of pregnancy to minimize maternal and neonatal morbidity and mortality.

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**ERRATA**

Author of “Association between maternal body mass index and the birth weight of neonates. Printed in NMCJ March 2011; Vol. 13: No. 1. page no. 42-45 on S Upadhyay, RP Biccha, MT Sherpa, S Shrestha and PP Pantta has been corrected as *Upadhyay, RP Biccha, MT Sherpa, R Shrestha and PP Pantta*