

## Prevalence of Asymptomatic Bacteriuria in Preterm Labour and Its Maternal and Perinatal Outcome

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**BACKGROUND:** Asymptomatic bacteriuria is a condition in which larger than normal numbers of bacteria are present in the urine but without any symptoms. In pregnancy the anatomical and physiological changes in the maternal urinary tract leads to stasis of urine encouraging the growth of bacteria which has an adverse effect on pregnancy.

**AIM** This study was conducted to estimate the prevalence of asymptomatic bacteriuria in preterm labour, to find out the most common organism involved and to study the maternal and neonatal outcome.

**Materials and methods** This was an observational study conducted on 100 pregnant women who came in preterm labour without any clinical features of Urinary tract infections. Urine samples were collected by standard methods and sent to the laboratory for microscopic and culture studies. The subjects were further observed for the maternal and neonatal outcome and the results were documented.

**RESULTS** Among the 100 subjects studied 18 were positive for bacteria in the urine. The different organisms isolated in culture were identified. The most common organism being *E.coli* (55.5%) followed by *klebsiella* (22.2%). The prevalence was found to be highest in the third trimester between 28-33 weeks of gestation. The bacteriuric group showed an increased incidence of low birth weight (88.8%), low APGAR scores and a higher incidence of NICU admissions when compared to the non bacteriuric group. The incidence of maternal complications like anaemia was also higher in the bacteriuric group compared to the non bacteriuric group.

**CONCLUSION:** Asymptomatic bacteriuria in pregnancy has an adverse maternal and neonatal outcome and hence should be diagnosed and treated at an early stage of pregnancy.

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### I. Introduction

Preterm labour is defined by The World Health Organization as 'The onset of labour prior to the completion of 37 weeks of gestation in a pregnancy beyond 20 weeks of gestation'<sup>1</sup>. Preterm birth is the leading cause of neonatal morbidity and mortality worldwide and accounts for 75% of all the neonatal deaths and 50% of long term morbidity, including respiratory disease and neurodevelopmental impairment<sup>2</sup>. Urinary tract infection is one of the most common bacterial infections during pregnancy<sup>3</sup> which may or may not be symptomatic. Asymptomatic bacteriuria is a condition characterized by the presence of persistent, actively multiplying bacteria within the urinary tract without any symptoms of infection. A clean voided specimen of urine containing more than 100,000 organisms/ml is diagnostic<sup>4</sup>. Asymptomatic bacteriuria is an entity with possibly serious consequences in the form of fetal and maternal morbidity<sup>5</sup>. It can cause maternal complications like anaemia, acute pyelonephritis, recurrent infections, preterm labour, septicaemia and even death of the mother. It can cause fetal complications like intrauterine growth restriction, prematurity, low birth weight and poor APGAR scores leading to increased incidence of fetal morbidity and mortality. Asymptomatic bacteriuria is a risk factor for preterm birth and antibiotic therapy has been found to significantly reduce the risk. As asymptomatic bacteriuria is a risk factor for preterm labour the present study is undertaken to emphasise the need for its early diagnosis and treatment and thus reducing preterm deliveries.

### II. Aim And Objectives

To study the prevalence of asymptomatic bacteriuria in preterm labour and its effect on maternal and perinatal outcome and to identify the most common pathogenic organism causing the asymptomatic bacteriuria.

### **III. Materials And Methods**

This was an observational study conducted on 100 pregnant women in preterm labour who were admitted to the labour ward of the Department of obstetrics and Gynaecology, Gandhi Hospital/Medical college, Secunderabad, Telangana, India between the years February 2014 – August 2016.

#### **INCLUSION CRITERIA**

All the pregnant women in preterm labour (>20 weeks of gestation and <37 weeks) who do not show any signs and symptoms of urinary tract infections.

#### **EXCLUSION CRITERIA**

Patients with symptoms of urinary tract infections.

Patients with history of urinary tract infections during this pregnancy.

Patients with diabetes, hypertension and other pre-existing medical disorders.

Patients who had taken antibiotics in the last two weeks.

#### **METHODOLOGY**

After obtaining informed consent a total of 100 pregnant women in preterm labour were randomly selected for the study.

The criteria to document preterm labour included regular uterine contractions along with progressive changes in the cervix including effacement and dilatation.

A detailed history was taken regarding the socioeconomic status, menstrual history, obstetric history, past, personal and family history. A thorough general physical examination and obstetric examination was done to confirm the preterm labour. Routine blood investigations were done. The patients were instructed to collect mid stream urine sample by clean catch method for urine analysis and urine culture. A diagnosis of significant bacteriuria was made when the colony count was  $\geq 100,000/\text{ml}$ . After determining the plate count, organisms present were identified by culture and gram staining and the susceptibility to the antibiotics were determined by Disc - Diffusion method. Statistical analysis was made by registering the data in the computer by creating a spread sheet. The data was analysed and percentages for individual variables were calculated.

### **IV. Results**

A total of 100 women in preterm labour were enrolled into the study and were screened for asymptomatic bacteriuria. Out of the 100 women 18 women were bacteriuric. Thus the calculated incidence of asymptomatic bacteriuria was 18%.

The causative organisms were detected by the standard methods of culture and gram staining and the most common organism detected was *Escherichia coli* with an incidence of 55.5%, followed by *klebsiella* which was 22.2%. There were 2 cases of coagulate negative staphylococcus with an incidence of 16.6% and one case of *Proteus* with an incidence of 5.5%.

The relation of asymptomatic bacteriuria to the period of gestation was calculated and the highest percentage of bacteriurics were in the 28 -33 weeks gestational period with an incidence of 55.5 %.

The mode of delivery was studied in all eighteen bacteriuric women. Fourteen women had a spontaneous vaginal delivery with a percentage of 77.7% and four women had a caesarean section with an incidence of 22.2%. p value was obtained which was 0.79 which was not statistically significant.

The average birth weights were calculated and 17 women in the study group i.e. 94.4% had birth weights <2 kg. One woman delivered a baby of birth weight > 2 kg. p value obtained was 0.06 which was not significant statistically.

The APGAR score of the babies born to the bacteriuric mothers were studied. 55.5% of the bacteriuric group babies had a low APGAR score of less than 7 at 5 minutes when compared to babies born to non bacteriuric mothers where the APGAR score was low only in 28%.p value was obtained which was 0.02% which is statistically significant.

The need for NICU admission was calculated.66.6 % of babies in asymptomatic bacteriuria group had NICU admissions compared to 30.48% in the non bacteriuric group. P value obtained was 0.003 which was statistically significant.

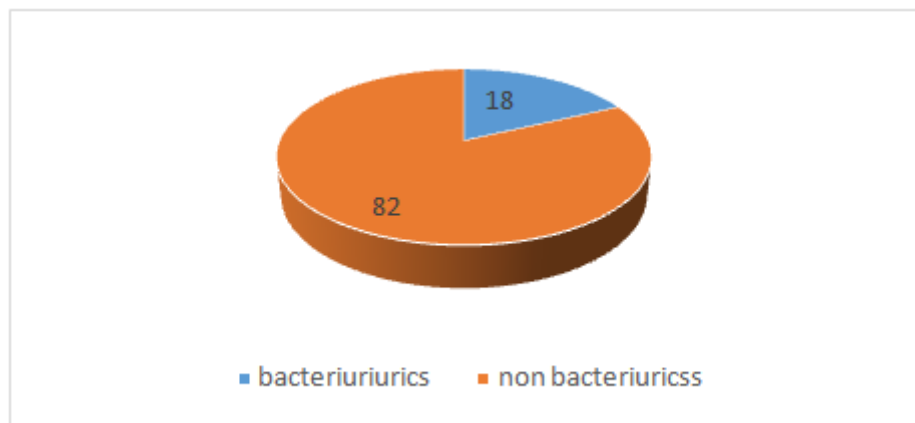
Haemoglobin estimation was done in all the study cases. Anaemia with a haemoglobin of <10 g was found in 55.5 % of the bacteriuric women which was high as compared to non bacteriuric patients where the incidence of anaemia was 30.4 % only and the need for blood transfusion was 30.4 % as compared to 6.09% in the non bacteriuric group. P value obtained is 0.036 which is statistically significant.

Tables

**TABLE 1**Prevalence of asymptomatic bacteriuria in preterm labour

No of patients	Non-bacteriurics	Bacteriurics	Prevalence of ASB in preterm labour
100	82	18	18%

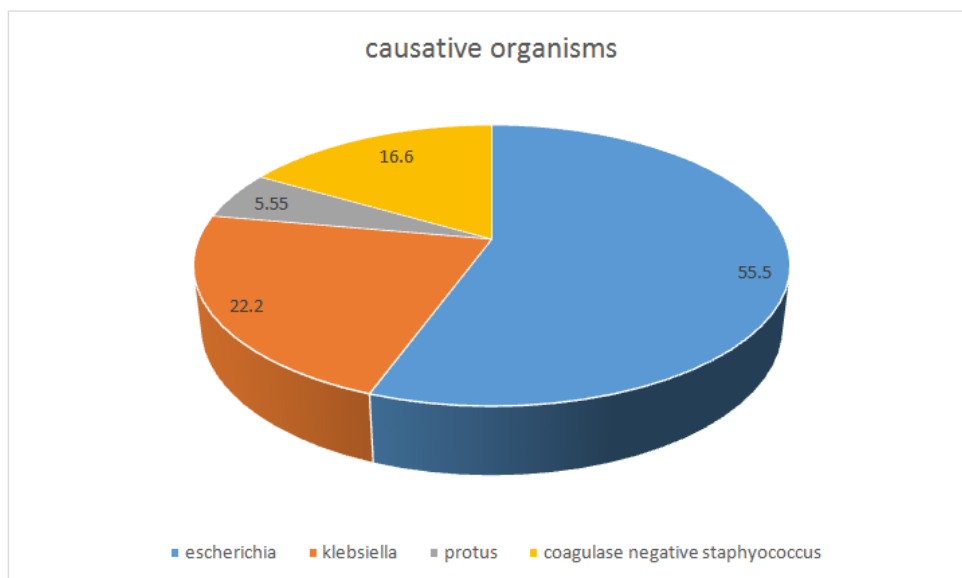
**PIE CHART 1:**Number of patients studied for asymptomatic bacteriuria



**TABLE 2** Causative organisms in asymptomatic bacteriuria

Pathogen	Number	Percentage%
Escherichia coli	10	55.5
Klebsiella	4	22.2
Proteus	1	5.55
Coagulase negative staphylococcus	3	16.6

**PIE CHART 2**



**TABLE 3** Relation of asymptomatic bacteriuria to period of gestation

Weeks of gestation	Bacteriurics		Non - Bacteriurics	
	Number	Percentage%	Number	Percentage%
20-27	1	5.55	3	3.61
28-33	10	55.5	45	54.8
34-36	7	38.8	34	41.4

**TABLE 4 Mode of delivery**

	<i>Bacteriurics</i>	<i>Non-Bacteriurics</i>
SPVD	77.7%	80.4%
LSCS	22.2%	19.5%

**TABLE 5 Relation of birth weight to asymptomatic bacteriuria**

	<i>Bacteriurics</i>	<i>Non-Bacteriurics</i>
<2kg	94.4%	74.3%
>2kg	5.55%	25.6%

**TABLE 6 Relation of APGAR to asymptomatic bacteriuria**

	<i>Bacteriurics</i>	<i>Non-Bacteriurics</i>
Good	44.4%	71.9%
Low	55.5%	28%

**TABLE 7 Relation of NICU admission to asymptomatic bacteriuria**

	<i>Bacteriurics</i>	<i>Non-Bacteriurics</i>
Yes	66.6%	30.48%
No	33.3%	69.5%

**TABLE 8 Incidence of anaemia in asymptomatic bacteriuria**

	<i>Bacteriurics</i>	<i>Non-Bacteriurics</i>
Anaemia with Haemoglobin <10g	55.5%	30.4%
Blood Transfusion	44.5%	6.09

## V. Discussion

Symptomatic infection of urinary tract in pregnancy has been well recognized since the last quarter of 19<sup>th</sup> century. The fact that asymptomatic urinary tract infection could occur in pregnant or other patients was however largely unrecognized until mid 1950s, when investigators first began to consider the quantitative aspect of urinary tract infection.

The association between asymptomatic bacteriuria and preterm delivery (<37 weeks of gestation) and that between asymptomatic bacteriuria and low birth weight (<2500 grams) were unknown until 1962 when Kass et al first published an account of fortuitous observation while looking for kernicterus in new born of mothers treated with long acting sulphonamides. He noted an increased risk among untreated bacteriuric women for delivery of low birth weight infants<sup>6</sup>. In the present study the incidence of asymptomatic bacteriuria among preterm labour was found to be 18 % which is consistent with the study done by Kass. Sheiner E Drey EM & Levy A (2009) concluded that patient with asymptomatic bacteriuria were more likely to deliver preterm 13.3% vs 7.6% and delivery of low birth neonates<sup>7</sup>.

Delzell JE & Lefevre ML (2000)<sup>8</sup> defined asymptomatic bacteriuria as persistent, actively multiplying bacteria of more than or equal to 100,000 colony forming unit per ml of urine without any symptoms of urinary tract infection. Hooton TM et al., (2000)<sup>9</sup> concluded that urinary tract is the most common medical complication of pregnancy. Asymptomatic bacteriuria is the most prevalent of these infections.

In the present study E. coli was the commonest organism causing ASB with a prevalence of 55.5 %. In a study conducted by Prasanna. B et al in the year 2015 E. coli was isolated in 62% of the cases which can be comparable to the present study. Studies done by Sabharwal et al also showed E. coli as the commonest organism isolated in asymptomatic bacteriuria.

In the present study maximum incidence of bacteriuria was found between 28-33 weeks of gestation with an incidence of 54.8%. The study conducted by Prasanna B et al<sup>10</sup> showed that 49% of women in the study group in the 3<sup>rd</sup> trimester had asymptomatic bacteriuria which can be comparable to the present study. This also correlates with the study done by Jayaseelan et al<sup>11</sup>. The incidence of ASB is more pronounced in the third trimester probably because of the anatomical and physiological changes related to advancing gestational age. This leads to stasis of urine and bacterial multiplication.

Incidence of low birth weight babies in the present study was 72.2% among the bacteriuric women when compared to 51.2% in the non bacteriuric group. In a study conducted by G Nat et al<sup>12</sup> significantly higher rates 22.4 % of low birth weights were observed with bacteriurics when compared to 7.7% in non bacteriurics. Romero et al reported 54% higher risk of low birth weight babies in women with asymptomatic bacteriuria.

In the present study 55.5 % of the babies of bacteriuric mothers had a low Apgar score of less than 7 and 66.6% required NICU admission as compared to 28% and 30.4% of the non bacteriuric group respectively.

The incidence of anaemia among the bacteriuric group was 55.5% where as the incidence in non bacteriuric group was 30.4%. In a study conducted by Ajoy Ghost 81.2% of women with Asymptomatic bacteriuria had anaemia.

In the present study, the association between pus cells and asymptomatic bacteriuria was observed. 77.7% of the bacteriurics had pus cells > 5/hpf and 22.3% had pus cells < 5 /hpf in the complete urine analysis where as in the non bacteriurics 90.2% had pus cells of <5/hpf, but 9.7% had pus cells of >5/hpf but without significant bacteriuria. so, pus cells >5 /hpf in the urine sample was associated with significant bacteriuria, but still cannot be used as a screening test for asymptomatic bacteriuria as 9.7% of patients did not have any bacteriuria. Hence the present study shows that pyuria cannot be used for screening of asymptomatic bacteriuria as this test has a sensitivity of 77.7% and a specificity of 90.2%. According to Prasanna.B et al in 2015, 90% of patients with asymptomatic bacteriuria had pyuria while only 21% patients without asymptomatic bacteriuria had pyuria. Thus high sensitivity of pyuria to detect asymptomatic bacteriuria and a negative predictive value of 89% defines probability of no asymptomatic bacteriuria among patients without pyuria.

## VI. Conclusions

The present study concludes that asymptomatic bacteriuria can cause preterm labour with a poor neonatal outcome like low birth weight, low APGAR score, increased NICU admissions and also increased incidence of maternal complications like anaemia. Hence the present study concludes that screening for bacteriuria should be done at the very first antenatal visit. Standard methods of culture are recommended for screening. All the patients diagnosed with asymptomatic bacteriuria should be promptly treated with appropriate antibiotics to prevent the maternal and neonatal complications associated with it.

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