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### Corresponding Author

G. Baby Shalini,  
Department of OBG, Apollo Institute  
of Medical Sciences and Research  
Centre Chittoor Andhra Pradesh,  
India

### Author Designation

<sup>1</sup>Post Graduate Student

<sup>2,3</sup>Assistant Professor

<sup>4</sup>Professor

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## Incidence of Asymptomatic Bacteriuria in Pregnancy: Hospital Based Observational Study

<sup>1</sup>G. Baby Shalini, <sup>2</sup>Peddi Reddy Lakshmi Keerthana, <sup>3</sup>Manium Prasanthi and <sup>4</sup>Seshasai Tirupati

<sup>1-4</sup>*Department of OBG, Apollo Institute of Medical Sciences and Research Centre Chittoor Andhra Pradesh, India*

### ABSTRACT

Asymptomatic bacteriuria is present in 2-7 percent of pregnant women. It commonly happens in the early stages of pregnancy, with just about 25% of instances being detected in the second and third trimesters. Factors linked to an increased incidence of bacteriuria include a previous urinary tract infection, pre-existing diabetes mellitus and a low socioeconomic status. Pregnant women attending to antenatal op of unit 1 at DHH and who doesn't have any symptoms and signs of urinary tract infections or other renal problems. Asymptomatic bacteriuria was positive among 88% patients and negative among 12% of patients. E. coli was the most common organism cultured followed by klebsiella among 25% patients.

## INTRODUCTION

The prevalence of bacteriuria in pregnant women is similar to that in nonpregnant women., however, the recurrence of bacteriuria is more frequent during pregnancy. Moreover, the prevalence of pyelonephritis is elevated compared to the whole population, most likely due to physiological alterations in the urinary system that occur during pregnancy. Asymptomatic bacteriuria is present in 2-7 percent of pregnant women. It commonly happens in the early stages of pregnancy, with just about 25% of instances being detected in the second and third trimesters. Factors linked to an increased incidence of bacteriuria include a previous urinary tract infection, pre-existing diabetes mellitus and a low socioeconomic status<sup>[1]</sup>. If left untreated, between 20-35 percent of pregnant women with asymptomatic bacteriuria will experience the development of a symptomatic urinary tract infection (UTI), such as pyelonephritis, during pregnancy. The risk is diminished by 70-80 percent if bacteriuria is eliminated. A study conducted in the Netherlands found that the rate of pyelonephritis was low among 208 women with untreated asymptomatic bacteriuria (2.4 percent) compared to 4035 women without bacteriuria (0.6 percent). However, it is important to note that this study only included low-risk women with uncomplicated singleton pregnancies who did not have diabetes mellitus or urinary tract abnormalities. Therefore, it is unclear whether these findings can be applied to a broader population<sup>[2]</sup>. The occurrence rate of acute cystitis in pregnant women is roughly 1-2 percent, while the estimated incidence rate of acute pyelonephritis during pregnancy is 0.5-2 percent<sup>[3]</sup>. The majority of pyelonephritis cases occur in the second and third trimesters of pregnancy. A prospective study was conducted on a general obstetric population to assess the occurrence of acute pyelonephritis during pregnancy, specifically in the context of routine prenatal screening for asymptomatic bacteriuria. Over the course of the two-year study, a total of 440 instances of acute pyelonephritis were detected among a population of 32,282 pregnant women, resulting in a rate of 14 occurrences per 1000 deliveries. 53 percent of the instances occurred during the second trimester. Aside from untreated bacteriuria, several clinical features have been linked to acute pyelonephritis in pregnant women. These include being under the age of 20, having no previous pregnancies, smoking, seeking medical care late, having sickle cell trait and having pre-existing diabetes (not gestational diabetes)<sup>[4]</sup>.

## MATERIALS AND METHODS

**Study Design:** Hospital based Observational study.

**Study Population:** Pregnant women attending to antenatal op of unit 1 at DHH and who doesn't have any symptoms and signs of urinary tract infections or other renal problems.

**Study Period:** Study will be done over a period of 1 year from the date of approval.

**Sample Size:** Pregnant women with asymptomatic bacteriuria were followed longitudinally for certain maternal and fetal outcome. The sample size is required to follow up pregnant women with asymptomatic bacteriuria to observe the fetal outcome of LBW and preterm birth is 50. the confidence level is 90% and relative precision specified is 0.23.

### Inclusion Criteria:

- Pregnant women attending antenatal clinic irrespective of parity.
- Pregnant women with no signs and symptoms of UTI.
- Pregnant women planning to get delivered at our hospital.
- Pregnant women who gave consent for the study.

### Exclusion Criteria:

- Symptoms of UTI (flank pain, dysuria).
- Who has taken antibiotic therapy recently (within 7days).
- Who are not willing to participate in the study.
- History of urolithiasis.
- History of preterm delivery, PROM.
- Known case of renal diseases and patients with renal anomalies.
- History of fetal congenital malformations.

### Data Collection:

- The study was conducted over a period of 1 year among the pregnant women attending the antenatal op at DHH.
- There was no be history of taking antibiotics for any reason within the last 2 weeks.
- Pregnant with history or complaints suggestive of UTI were excluded
- The aim of the study was explained to them and informed consent was obtained.
- Patients who are not willing to participate in this study were excluded.
- Apart from the routine investigations taken during the first visit, a midstream clean catch early morning urine sample was collected from each of them.
- The method to reduce the chances of contamination was explained to them.
- The sample was collected in sterile containers and sent for processing immediately or within two hours of collection.
- The urine sample, one portion was sent for routine urine analysis and another portion sent for culture and sensitivity and colony count.

## RESULTS AND DISCUSSIONS

**Table 1: Age Distribution of Patients**

Age (years)	Frequency	Percentage
20-25	42	42.0
26-30	38	38.0
31-35	20	20.0
Total	100	100.0

It was observed that majority (42%) patients were in the age group 20-25 years followed by 38% patients in the age group 26-30 years.

**Table 2: Gravidity Among Patients**

Gravida	Frequency	Percentage
Primi	76	76.0
G2	13	13.0
G3 and above	11	11.0

Majority of patients 76% were primi followed by 13% patients who were second gravida.

**Table 3: Socioeconomic Status Among Patients**

Socioeconomic class	Frequency	Percentage
Class I	02	2.0
Class II	27	27.0
Class III	62	62.0
Class IV	09	9.0
Total	100	100.0

It was found that 62% patients were in Class III and 27% patients were in socioeconomic class II.

**Table 4: Asymptomatic Bacteriuria Among Patients**

Urine culture	Frequency	Percentage
Positive	12	12.0
Negative	88	88.0
Total	100	100.0

Asymptomatic bacteriuria was positive among 88% patients and negative among 12% of patients.

**Table 5: Urine Nitrite Dipstick Test Among Patients**

Asymptomatic bacteriuria	Urine nitrite dipstick test		
	Positive No. (%)	Negative No. (%)	p-value
Bacteriurics (n=12)	10(76.9)	02(2.29)	0.001*
Non-bacteriurics (n=88)	03(23.0)	85(97.7)	
Total	13(100.0)	87(100.0)	

\*Chisquare test., pvalue<0.05 is significant

Urine nitrite dipstick test was positive among 10(76.9%) patients among Bacteriurics and positive among 03(23%) patients in non-bacteriurics. This difference is observed to be statistically significant.

**Table 6: Urine Routine Microscopy Among Patients**

Urine routine microscopy	Bacteriurics (n=12) No. (%)	Non-bacteriurics (n=88) No. (%)	p-value
Urine protein			
Positive	05(41.6)	12(13.6)	0.01*
Negative	07(58.3)	76(86.3)	
Urine pus cells			
Positive	09(75.0)	04(4.5)	0.001*
Negative	03(25.0)	84(95.4)	

\*Chisquare test; pvalue<0.05 is significant

Urine protein was positive among 41.6% of Bacteriurics and 13.6% of non-bacteriurics. Urine pus cells was

positive among 75% patients in bacteriurics and 4.5% patients in non-bacteriurics. The detection of Bacteriuria by urine routine microscopy is statistically significant.

**Table 7: Organisms Cultured Among Bacteriurics**

Organisms cultured	Frequency	Percentage
E. coli	08	66.6
Klebsiella	03	25.0
Staphylococcus aureus	01	8.3
Total	12	100.0

E. coli was the most common organism cultured followed by klebsiella among 25% patients.

**Table 8: Antibiogram Showing Susceptibility Pattern Among Organisms Cultured**

Organisms cultured	Antibiogram				
	Ciprofloxacin	Norfloxacin	Cefixime	Amikacin	Ampicillin
E. coli (n=08)	08	08	06	08	04
Klebsiella (n=03)	03	03	03	03	02
Staphylococcus aureus(n=01)	01	01	01	01	-

It was observed that E. coli was resistant to Ciprofloxacin, Norfloxacin and Amikacin and few cultured E.coli was susceptible to Cefixime and Ampicillin. Klebsiella was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin, susceptible to Ampicillin. Staphylococcus aureus cultured in the patients of this study was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin.

Asymptomatic bacteriuria constitutes a minor fraction of the total bacterial presence in the urine. Pregnancy induces the conversion of illnesses that show no symptoms into infections that show symptoms. Approximately 10% of pregnant individuals with asymptomatic bacteriuria develop symptomatic bacteriuria. The identification and management of symptomatic bacteriuria are uncomplicated due to its evident manifestations. Diagnosing asymptomatic bacteriuria is difficult and it is more common in pregnant women than in non-pregnant women. Untreated bacteriuria in pregnant women can lead to symptomatic urinary tract infections in around 25% of cases. Treating the risk results in a reduction of 80-90%. Therefore, it is imperative to routinely assess and manage all pregnant women with asymptomatic bacteriuria (ASB). Hence, the objective of this study is to examine the influence of screening and treating Asymptomatic bacteriuria on the outcomes of both the mother and the fetus. In the current study, it was observed that majority (42%) patients were in the age group 20-25 years followed by 38% patients in the age group 26-30 years. Majority of patients 76% were primi followed by 13% patients who were second gravida. In another study by Byna *et al.*, 2015, age distribution varied from 18-38 years and highest number of culture positive cases were in the age group of 26-35 years (54%) followed by 37% in age group below 26 years and 9% above 35 years<sup>[5]</sup>. Whereas in a study by

Totadhri *et al.*, 2022, nearly 75% of the patients with ASB belonged to the age group of 24-27 years<sup>[6]</sup>. This is comparable to other studies conducted by Rohini<sup>[7]</sup> and Rao *et al.* Socioeconomic status among patients. It was found that 62% patients were in Class III and 27% patients were in socioeconomic class II. Asymptomatic bacteriuria among patients. Asymptomatic bacteriuria was positive among 88% patients and negative among 12% of patients. Asymptomatic bacteriuria is present in 2-7 percent of pregnant women. It commonly happens in the early stages of pregnancy, with just about 25% of instances being detected in the second and third trimesters. Factors linked to an increased incidence of bacteriuria include a previous urinary tract infection, pre-existing diabetes mellitus and low socioeconomic position. Untreated, between 20-35 percent of pregnant women with asymptomatic bacteriuria will experience the development of a symptomatic urinary tract infection (UTI), such as pyelonephritis, while pregnant. The risk is diminished by 70-80 percent if bacteriuria is eliminated. A study conducted in the Netherlands found that the rate of pyelonephritis was low among 208 women with untreated asymptomatic bacteriuria (2.4 percent) compared to 4035 women without bacteriuria (0.6 percent). However, it is important to note that this study only included low-risk women with uncomplicated singleton pregnancies who did not have diabetes mellitus or urinary tract abnormalities. Therefore, it is unclear if these findings can be applied to a broader population<sup>[8]</sup>. In the current study, urine nitrite dipstick test was positive among 10(76.9%) patients among Bacteriurics and positive among 03(23%) patients in non-bacteriurics. This difference is observed to be statistically significant. Urine protein was positive among 41.6% of Bacteriurics and 13.6% of non-bacteriurics. Urine pus cells was positive among 75% patients in bacteriurics and 4.5% patients in non-bacteriurics. The detection of Bacteriuria by urine routine microscopy is statistically significant. In the current study, regarding organisms cultured among Bacteriurics, *E. coli* was the most common organism cultured followed by *klebsiella* among 25% patients. *E. coli* was the most prevalent microbiological isolate. This is in conformity with various research<sup>[9]</sup>. The other frequently seen isolates included *Klebsiella pneumoniae*, *Enterococcus*, Group B *Streptococcus* (GBS) and coagulase-negative staphylococci (CONS). The results of this investigation are consistent with the findings of earlier studies. It was observed that *E. coli* was resistant to Ciprofloxacin, Norfloxacin and Amikacin and few cultured *E. coli* was susceptible to Cefixime and Ampicillin. *Klebsiella* was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin, susceptible to Ampicillin. *Staphylococcus aureus*

cultured in the patients of this study was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin. Antibiotic resistance is undergoing a shift in pattern, necessitating constant monitoring of susceptibility patterns. Nitrofurantoin exhibited susceptibility to gram-negative microbes. The gram-positive organisms exhibited susceptibility to ampicillin and nitrofurantoin. Nitrofurantoin has been identified as the most efficacious antibiotic for treating asymptomatic bacteriuria (ASB) during pregnancy. Multiple investigations have revealed comparable patterns of sensitivity. Ampicillin can be employed as it is considered safer during pregnancy and has less adverse effects. The development of resistance to medications such as amoxicillin can be linked to their inappropriate usage and empirical prescription of these drugs throughout the years<sup>[10]</sup>.

## CONCLUSION

- Urine routine microscopy among patients. Urine protein was positive among 41.6% of Bacteriurics and 13.6% of non-bacteriurics. Urine pus cells was positive among 75% patients in bacteriurics and 4.5% patients in non-bacteriurics. The detection of Bacteriuria by urine routine microscopy is statistically significant.
- Organisms cultured among Bacteriurics. *E. coli* was the most common organism cultured followed by *klebsiella* among 25% patients.
- Susceptibility pattern among organisms cultured. It was observed that *E. coli* was resistant to Ciprofloxacin, Norfloxacin and Amikacin and few cultured *E. coli* was susceptible to Cefixime and Ampicillin. *Klebsiella* was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin, susceptible to Ampicillin. *Staphylococcus aureus* cultured in the patients of this study was resistant to Ciprofloxacin, Norfloxacin, Cefixime and Amikacin.

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