

## ORIGINAL RESEARCH

### A Study of Maternal and Foetal Outcomes in Cases of Asymptomatic Bacteriuria

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#### ABSTRACT

**Background:** To determine the number of women with asymptomatic bacteriuria (Group A) and the number of women with symptomatic bacteriuria (Group B) (Group B). To identify the most common pathogenic organism in women with asymptomatic bacteriuria. To compare the outcomes of pregnancies in groups A and B (maternal and foetal morbidity).

**Materials and Methods:** Pregnant women visiting the antenatal clinic of the Department of Obstetrics and Gynecology in Govt Medical College/General Hospital Suryapet for the first time in 20 weeks to 36 weeks were the subjects of this prospective study.

**Results:** The study included 250 pregnant women starting at 20 weeks of gestation. Urine culture and sensitivity testing were performed to check for asymptomatic bacteriuria. Asymptomatic bacteriuria was found in 8.8 percent of the study population. E.Coli was the most common pathogen, accounting for 63.63 percent of all cases. Asymptomatic bacteriuria was associated with increased maternal morbidity (18.18 percent). Those who did not have asymptomatic bacteriuria had lower morbidity (9.1 percent). Fetal morbidity was higher (21.4 percent) in kids whose mothers had asymptomatic bacteriuria than in those whose mothers did not have silent bacteriuria (9.3 percent). Preterm labour was the most prevalent maternal morbidity (18.18 percent), while low birth weight was the most common foetal morbidity (18.18 percent). There was no maternal or foetal death.

**Conclusion:** To improve the materno-fetal outcome, pregnant women should be checked for bacteriuria and treated if test findings are positive.

**Keywords:** Bacteriuria, Fetal Morbidity, Urine Culture, Low Birth Weight, Pregnancy.

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#### INTRODUCTION

One of the types of bacterial infections that affect people the most frequently is an infection of the urinary tract.<sup>[1]</sup> It is the bacterial infection that occurs during pregnancy at a rate that is the second most frequent overall.<sup>[2]</sup> There may or may not be any symptoms associated with the bacterial infection. The symptomatic urinary tract infection may or may not be complicated, depending on the severity of the symptoms. Symptomatic urinary tract infection is a type of urinary tract infection that is characterised by frequency, urgency, dysuria, or suprapubic pain in a woman who otherwise has a normal genitourinary tract. This type of urinary tract infection is known as uncomplicated urinary tract infection.<sup>[3]</sup> A woman who has functional or structural abnormalities of the genitourinary tract that impact either the bladder

or the kidneys are said to have a complicated urinary tract infection. This infection can affect either the bladder or the kidneys.<sup>[4]</sup> The presence of bacteria that can survive and actively grow within the urinary tract despite the absence of any symptoms associated with an infection is known as an asymptomatic urinary tract infection.<sup>[5]</sup> The prevalence of pregnancy ranges from 2% to 7%, and the exact number fluctuates depending on factors such as parity, race, and socioeconomic background.<sup>[6]</sup> If asymptomatic bacteriuria is not treated, around 25 percent of pregnant women will go on to develop severe signs of infection.<sup>[7]</sup> Asymptomatic bacteriuria, often known as ASB, is a condition that can have major repercussions, including morbidity for the mother and the developing baby.<sup>[8]</sup> It can bring about maternal anaemia, acute pyelonephritis, recurrent infection, premature labour, septicaemia, and even the death of the mother.<sup>[10]</sup> It can induce intrauterine growth restriction, preterm, low birth weight for the foetus, as well as foetal mortality.<sup>[9,10]</sup> Screening asymptomatic people for bacteriuria is appropriate because bacteriuria is associated with several negative outcomes that can be avoided with antimicrobial treatment. Aside from that, even the transition from asymptomatic bacteriuria to symptomatic bacteriuria was a symptomatic UTI in later life can be prevented, which highlights the fact that "prevention is better than cure." Symptomatic UTIs in later life can be prevented.

**Aim of the study:**

The purpose of this study was to determine the proportion of women who had asymptomatic bacteriuria (Group A) and the proportion of women who had symptomatic bacteriuria (Group B).

(The B Group)

The purpose of this study was to determine which organism is the most prevalent cause of asymptomatic bacteriuria in women.

It is the purpose of this study to examine the outcomes of pregnancies (maternal and foetal morbidity) in groups A and B.

**MATERIALS & METHODS****Subjects:**

Pregnant women visiting the antenatal clinic of the department of Obstetrics and Gynaecology in Govt General Hospital, Suryapet, for the first time from 20 weeks to 36 weeks.

**Type of Study:** Prospective Study.

**Number of Groups:** Group A- Antenatal women with asymptomatic bacteriuria Group B- Antenatal women with symptomatic bacteriuria.

**Sample Size:** 250 pregnant women.

**Period of study:** January 2020- January 2022.

**Inclusion criteria:**

Antenatal women between 20-36 weeks of gestation with urinary tract infection of which, group A consists of pregnant women free from symptoms of UTI such as; abdominal pain, fever, burning micturition, increased/decreased frequency of micturition, and dysuria Group B consists of pregnant women with the presence of symptoms of urinary tract infection.

**Exclusion criteria:**

Patients with history of urinary tract infection previously, within the past one year

Patients with diabetes, chronic hypertension, hypertensive disorders in previous pregnancies, any renal disorders, any heart disease, and other pre-existing medical disorders

Patients who are taking antibiotics currently or in the last 6 months due to various reasons

### **Methodology:**

Assessment for urinary tract infections was performed on a random sample of one thousand pregnant women who were between 20 and 36 weeks of gestation and who attended the antenatal outpatient department and had pyuria on regular full urine examination. They were informed about the study, and then their agreement was sought in order for them to take part in the investigation. They were educated on how to give a urine sample for culture using the clean catch method in the midstream of the stream. A clean catch urine sample from the middle of the stream was taken and placed in a sterile plastic container. The sample was analysed for both the culture and sensitivity of the urine. The sample was delivered straight away to the laboratory, where it was examined and analysed within the first half hour. The sample was cultivated using different types of media, including Blood Agar and MacConkey's Media. It was determined how many organisms may be found in one millilitre of urine. We utilised a semi-quantitative method of cultivation based on the calibrated loop methodology. The sample was analysed to determine the type of organism present in the culture, and its sensitivity to antibiotics was tested and reported using first-line and, in certain instances, second-line medications.

Significant bacteriuria was considered to exist when there were more than 10<sup>5</sup> pathogenic organisms belonging to a single species in 1 millilitre of urine. The antibiotic sensitivity data served as the basis for the treatment that was selected. There were a total of 1000 patients that were screened, and 250 of them patients had urinary tract infections. Women who had UTIs but did not exhibit any symptoms were placed in Group A, whereas women who did exhibit symptoms were placed in Group B. There were 250 patients in total with UTIs.

### **Maternal Mortality**

Maternal morbidity defined as presence of at least one of the following factors:

**Preterm Labour** - less than 37 completed weeks

**Prom** - Premature rupture of membrane in gestation less than 37 completed weeks

**Preeclampsia** - Blood pressure of more than or equal to 140/90mmHg on two occasions 6 hours apart, along with or without proteinuria

### **Fetal Morbidity:**

Fetal morbidity is defined as presence of one or more of the following factors: Low Birth Weight - Birth weight less than 2.5kgs

Low APGAR score - APGAR score less than 7/10

## **RESULTS**

A total of 1000 antenatal patients were screened, of which 250 patients were positive for urinary tract infection. Those 250 patients were further divided into group A (asymptomatic bacteriuria), and group B (symptomatic bacteriuria).

**Table 1: Distribution of Study Population**

<b>Study population</b>	<b>N=250 (%)</b>
GROUP A	22[8.8%]
GROUP B	228[91.2%]
Total	250 (100.0%)

Out of the 250 pregnant women who had urinary tract infection, 9.33% had asymptomatic bacteriuria and belonged to Group A. 91.2 %had symptomatic bacteriuria and belonged to group B. Thus the incidence of urinary tract infection inantenatal women was 2.78%. And the incidence of asymptomatic bacteriuria in the screened women with pyuria is 9.33%.

**Table 2: Age Distribution**

Age	Group A	Group B
<20 years	9 (40.9%)	28(12.28%)
20-30 years	10 (45.45%)	184 (80.70%)
>30 years	3(13.63%)	24(10.52%)
Total	22 (100%)	228 (100%)

A maximum number of women with asymptomatic bacteriuria were aged between 20- 30 years (45.45%). Similarly, the maximum number of symptomatic women werealso aged between 20-30 years (80.7%) $\chi^2=21.2$ ,  $p= 0.00082$  (<0.001), Highly Significant.

**Table 3: ?**

Socioeconomic Status	GROUP A	GROUP B
LOW	17 (77.27%)	221 (96.93%)
MIDDLE	5 (22.73%)	5 (2.19%)
HIGH	0 (0%)	2 (0.87%)
Total	22 (100%)	228(100%)

Majority of asymptomatic women belonged to Low Socioeconomic Status (77.27%).Similarly, majority of symptomatic women also belonged to low socioeconomic status (96.63%). Least incidence is seen in women belonging to high socioeconomic status.

**Table 4: Distribution of Parity**

Gravida	Group A	Group B
Primigravida	19 (86.36%)	18 (7.88%)
Multigravida	4 (18.18%)	210(92.12%)
Total	22 (100%)	228 (100%)

The majority of asymptomatic women were primigravida (71.4%). Whereas, htemajority of symptomatic women were Multigravida (92.12%).

**Table 5: Gestational Age at the Time of Delivery**

Gestational Age	GROUP A	GROUP B
<37 weeks	5(22.72%)	27 (11.84%)
37-40 weeks	14 (63.63%)	195 (85.52%)
>40 weeks	3 (13.64%)	6 (2.64%)
Total	22 (100%)	228 (100%)

Most of the asymptomatic women delivered at term (63.63%). Similarly, most of the symptomatic women also delivered at term (85.52%)

**Table 6: Preterm**

<b>Preterm</b>	<b>Group A</b>	<b>Group B</b>
With Preterm	4 (15.3%)	30 (13.39%)
Term	22 (84.61%)	220 (98.21%)
Total	26 (100%)	224 (100%)

Out of 250 women, 15.3% of asymptomatic women had preterm labour, whereas 13.39% of symptomatic women had preterm labour.

**Table 7: PROM**

<b>Prom</b>	<b>Group A</b>	<b>Group B</b>
With PROM	1(4.54%)	2(0.87%)
Without PROM	21(95.46%)	226(99.12%)
Total	22(100%)	228(100%)

Out of 250 women, 4.54 % of asymptomatic women had PROM, and 0.87 % of symptomatic women had PROM.

However, the majority of the women who were symptomatic (98.9%) and asymptomatic (95.46 %) did not have PROM.

**Table 8: Preeclampsia Group B**

<b>Preeclampsia</b>	<b>GROUP A</b>	<b>GROUP B</b>
With Preeclampsia	1 (5 %)	2(0.86%)
Without Preeclampsia	19 (95.0%)	228 (99.13%)
Total	20 (100%)	230 (100%)

Only 5.0 % of women with asymptomatic bacteriuria had preeclampsia, and 0.86% women with symptomatic bacteriuria had preeclampsia. Whereas, majority of women with asymptomatic bacteriuria (95.0 %) and with symptomatic bacteriuria (99.13%) did not have preeclampsia.

**Table 9: ?**

<b>Study Population</b>	<b>Group A n-28 (%)</b>	<b>Group B n- 272 (%)</b>	<b>Total 250(100.00%)</b>
With maternal Morbidity	5(27.77%)	23(9.91%)	28(11.20%)
Without Maternal Morbidity	13(72.22%)	209(90.086%)	227(81.07%)
Total	18(100%)	232(100%)	250(100%)

In this study of 250 patients, majority of the women with asymptomatic bacteriuria (72.22%) and majority of women with symptomatic bacteriuria (90.086%) did not have any maternal morbidity.

However, a total of 11.20% of women, either with symptomatic or asymptomatic bacteriuria had some maternal morbidity.

**Table 10: Birth Weight**

<b>Birth Weight</b>	<b>Group A</b>	<b>Group B</b>
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<2.5 kgs	4 (18.18%)	11 (4.82%)
2.5-3.5 kgs	9 (40.90%)	207 (90.78%)
>3.5 kgs	9 (40.9 %)	10 (4.38%)
Total	22 (100%)	228 (100%)

18.18% women of asymptomatic bacteriuria delivered babies with birth weight <2.5 kgs, whereas 4.82% women with symptomatic bacteriuria had babies with <2.5 kgs.

**Table 11: Low birth weight**

Low Birth Weight	GROUP A	GROUP B
With LBW	3 (13.63%)	11 (4.82%)
Without LBW	19 (86.36%)	217 (95.18%)
Total	22 (100%)	228 (100%)

Women who delivered babies with low birth weight, having asymptomatic bacteriuria were 13.63%. Whereas, only 4.82 % women with symptomatic bacteriuria delivered low birth weight babies. Most of the babies were not low birth weight in women with asymptomatic (86.36%) and symptomatic bacteriuria (95.6%).

**Table 12: Low APGAR Score**

Low APGAR	Group A	Group B
With Low APGAR	0 (0%)	3 (1.13%)
Normal APGAR	22 (100%)	225 (98.68%)
Total	22 (100%)	228 (100%)

100% of babies of women with asymptomatic bacteriuria had a normal APGAR score. Only 1.13% of babies of women with symptomatic bacteriuria had a low APGAR score (less than 7/10).

**Table 13: NICU Admissions**

NICU Admission	GROUP A	GROUP B
Admitted	2 (9.09%)	8 (3.50%)
Not Admitted	20 (90.01%)	220 (96.49%)
Total	22 (100%)	228 (100%)

7.14% babies of women with asymptomatic bacteriuria were admitted in NICU. Only 3% babies of women with symptomatic bacteriuria were admitted in NICU.

**Table 14: Causative organism found in cases of asymptomatic bacteriuria**

Organism	Group A	%	Group B	%
E. Coli	16	72.73%	171	75.0 %
Coagulase Negative Staphylococci	4	18.18%	41	17.99%
Klebsiella Pneumoniae	2	9.09%	16	7.01%
Alpha Hemolytic Streptococcus	0	0%	0	0%
Total	22	100%	228	100%

In majority of women with asymptomatic bacteriuria, Escherichia Coli was isolated, giving an incidence of 72.73 %. Similarly, in majority of the symptomatic bacteriuria women also Escherichia Coli was isolated, giving an incidence of 75.0 %. There were no cases of Alpha Haemolytic Streptococci.

**Table 15: Antibiotic sensitivity**

	Nitrofurantoin	Ampicillin	Amoxicillin	Ampiclox	Tetracycline	Sulfamethoxazole/ Trimethoprim
E.Coli (202)	160 (79.20%)	35 (57.1%)	26 (42.8%)	11 (42.8%)	10 (30.2%)	5(3.4%)
Coag. Neg. Staph. (70)	40 (19.8%)	10 (35.7%)	63 (31.6%)	30 (51.4%)	14 (25.7%)	3 (7.14%)
Kleb. Pneumoniae (28)	2 (0.9%)	89 (45%)	5 (17.8%)	26 (16.8%)	23 (12.3%)	21 (12.3%)
Total (250)	202 (80.8%)	134 (47%)	94 (33.6%)	67 (27.6%)	47 (18.6%)	29 (5%)

### Antibiotic Sensitivity According to Organism

Most common antibiotic found sensitive was Nitrofurantoin (68.6%) Least common antibiotic found sensitive was Sulfamethoxazole/Trimethoprim (5%).

### DISCUSSION

In the present study, the prevalence of asymptomatic bacteriuria is 8.8%. Different studies have shown varying incidences from 2-30% depending on the group under study like diabetes mellitus complicating pregnancy, and the methodology though diabetes mellitus was excluded from the current study. Robert et al,<sup>[11]</sup>(2000) had 30% incidence in his study. The dominant organism isolated in the study was Escherichia Coli which was 64.28%. Others were Klebsiella Pneumonia, Coagulase Negative Staphylococcus, which were found in less number. This is similar to the findings of previous studies by Robert et al.<sup>[11]</sup>

The highest age specific prevalence in the current study was found in age group of 20-30 years and lowest in more than 30 years. This is probably because this comes under reproductive age group and most of the patients had their pregnancy during this Highest parity in the asymptomatic bacteriuria group was in primigravida accounting for 86.3 %. Several authors have reported increasing rise of asymptomatic bacteriuria with age and parity like Harris et al,<sup>[12]</sup> in their study. Most (86%) of the patients with ASB in the present study belonged to low socioeconomic group, similar to many studies.<sup>[11,12]</sup> Preterm births in the current study was 25% in ASB patients. Findings from Gebre et al,<sup>[14]</sup> which prospectively studied 25,844 births and reported that ASB is not associated with preterm delivery. The authors concluded that ASB would be associated with preterm births only when it progresses to pyelonephritis. Whereas, Nerissa et al,<sup>[13]</sup> found in his study that there is a significant association between preterm births and asymptomatic bacteriuria. Low birth weight was seen in 18.8% of the present study. Keah et al et al,<sup>[14]</sup> reported that there was strong association between untreated urinary tract infection and low birth weight.<sup>[15]</sup>

### CONCLUSION

A common type of infection is called asymptomatic bacteriuria. Treatment of asymptomatic bacteriuria with antimicrobials lowers the risk of adverse maternal and foetal outcomes in pregnant women who have asymptomatic bacteriuria. This lowers the risk of adverse maternal and foetal outcomes could be prevented. In the research that we conducted, a total of 250 pregnant women were chosen at random, and out of those, 28 were found to have

asymptomatic bacteriuria. This results in a prevalence rate of 9.3 percent. *E. coli*, *Klebsiella pneumoniae*, and coagulase-negative staphylococci were the microorganisms that were isolated. *E. coli* was the most prevalent type of bacterium found in the research participants, making up 64.3% of the total. In patients who had ASB, the rate of maternal morbidity was 28.6 percent, while in those who did not have ASB, the rate was 9.9 percent. When compared to patients who did not have ASB, the foetal morbidity rate was much higher at 21.4% than the 10.3% rate seen in patients who did not have ASB. Therefore, pregnant women should be tested for bacteriuria and given treatment if the results of the test come back positive in order to enhance the prognosis for both the mother and the baby.

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### REFERENCES

1. Tache, A. M., Dinu, L. D., & Vamanu, E. (2022). Novel Insights on Plant Extracts to Prevent and Treat Recurrent Urinary Tract Infections. *Applied Sciences*, 12(5), 2635.
2. Sampson JE, Gravett MG, Other infectious conditions in pregnancy: James DK, Steer PJ, Weiner CP, Govik B eds. High Risk pregnancy, management options 2nd Edition, London WB Saunders, 1999:559-598.
3. Hooton TM, Stamm WE. Diagnosis and treatment of uncomplicated urinary tract infection. *Infect Dis Clin North Am* 1997; 11:551–82.
4. Reddy, M., & Zimmern, P. E. (2022). Efficacy of antimicrobial intravesical treatment for uncomplicated recurrent urinary tract infections: a systematic review. *International Urogynecology Journal*, 1-19.
5. Uncu Y, Uncu G, Esmer A et al. Should asymptomatic bacteriuria be screened in pregnancy? *Clin Exp Obstet Gynecol* 2002;29:281-5.
6. Nicolle LE Asymptomatic bacteriuria: when to screen and when to treat. *Infect Dis Clin North Am* 2203;17:367–394
7. Rubenstein JN, Schaeffer AJ Managing complicated urinary tract infections: The urologic view. *Infect Dis Clin North Am* 2003; 17:333-351
8. Patterson TF, Andriole VT. Detection, significance and therapy of bacteriuria in pregnancy. *Infect Dis Clin North Am*. 1997; 1:593-608.
9. Kremery S, Hromec J, Demesova D. Treatment of lower urinary tract infection in pregnancy. *Int J Antimicrobe Agents*. 2001; 17(4):279-82.
10. Sharma JB., Sharma S, Gulati N et al. Prevalence of significant bacteriuria in preterm labor. *J Obstet Gynecol India* 1990;40:336-8.
11. Robert Mittendorf, Michelle A. Williams and Edward H. Kass . Prevention of preterm delivery and low birth weight associated with asymptomatic bacteriuria. *Clin Infect Dis* 1992; 14(4):927-932.
12. Harris RE, Thomas VL Sheokov A *Amj Obstet gynecology* 1976 Sep 1;126 (1):20-5.
13. Nerissa Isabel C. Sescon, M.D., Felice D. Garinalao- Molina, M.D., Carla Elena J. Ycasiano, M.D., Mediadora C. Sanie, M.D., and Ricardo M. Manalastas, M.D. Prevalence of Asymptomatic Bacteriuria and Associated Risk Factors in Pregnant Women. *Phil J Microbiol Infect Dis* 2003; 32(2):63-69.
14. Keah SH., Wee EC., Chng KS, Keah KC Antimicrobial Susceptibility Of Community-Acquired Uropathogens In General Practice Malaysian Family Physician 2007; Volume 2, Number 2 64-69.

15. Maurya N.K "A Review: Patients Generated Subjective Global Assessment (PG-SGA)" in Journal International Research Journal of Pharmacy 2018, 9(11): 5-8.