

# Prevalence of asymptomatic bacteriuria in pregnant women in a rural tertiary care hospital at Jalna

Sufia M Siddiqui<sup>1\*</sup>, Arvind B Deshmukh<sup>2</sup>, Prasad L Bhanap<sup>3</sup>

{<sup>1</sup>Associate Professor, <sup>2</sup>Professor and HOD, Department of Microbiology} {<sup>3</sup>Professor, Department of OBGY}  
IIMSR, Warudi, Jalna, Maharashtra, INDIA.

Email: [sufia13379@rediffmail.com](mailto:sufia13379@rediffmail.com)

## Abstract

**Aims and Objectives:** A total 206 women attending the antenatal clinic at our rural hospital were evaluated for asymptomatic bacteriuria over a period of 3 months. Direct smear examination with wet mount examination, gram staining of uncentrifuged urine, and then culture and sensitivity testing to detect significant bacteriuria was carried out. **Results:** Of these 8.7% (18 women) showed significant bacteriuria. and the maximum incidence was found to be in the <25 age group(83.3%).Prevalence was found to be higher in second gravid (38.9%) and in second trimester of pregnancy(44.4%).Gram stain was found to be more sensitive and specific than wet mount examination. *Eschrechia coli* was found to be the predominant isolate (38.88%) followed by coagulase negative staphylococcus (33.33%) **Conclusions:** It is advised to screen all ANC women for asymptomatic bacteriuria repeatedly in all the three trimesters of pregnancy and to advocate treatment only if repeated samples show significant bacteriuria. **Keywords:** Asymptomatic bacteriuria, significant bacteriuria

## \* Address for Correspondence:

Dr. Sufia M. Siddiqui, Associate Professor, Department of Microbiology} IIMSR, Warudi, Jalna, Maharashtra, INDIA.

Email: [sufia13379@rediffmail.com](mailto:sufia13379@rediffmail.com)

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## INTRODUCTION

Females in reproductive age group are at an increased risk of Urinary tract infection (UTI) due to short urethra and close proximity to anus.<sup>1</sup> Pregnant women are considered immune compromised UTI hosts because of the maternal physiologic and anatomic factors which predispose to ascending infection. Such factors include urinary retention caused by the weight of the enlarging uterus and urinary stasis due to progesterone-induced ureteral smooth muscle relaxation causing vesicoureteral reflux. Blood-volume expansion is accompanied by increase in the glomerular filtration rate and urinary output. These

changes, along with an already short urethra (approximately 3-4 cm in females) and difficulty with hygiene due to a distended pregnant belly, increase the frequency of urinary tract infections (UTIs) in pregnant women.<sup>2</sup> Infections result from ascending colonization of the urinary tract, primarily by existing vaginal, perineal, and fecal flora. Prevalence of UTI increases from 1-5% in nonpregnant females to 1-9.9% in pregnancy<sup>3</sup> "Asymptomatic bacteriuria," or asymptomatic urinary infection, is isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection<sup>3</sup>. Pregnant women with asymptomatic bacteriuria are at high risk for foetal and maternal complications<sup>4</sup>. The foetus is at high risk for prematurity<sup>5,6</sup>, low birth weight, IUGR and perinatal mortality.<sup>5</sup> Maternal complications include overt UTI in 30-40% of antenatal women as pregnancy progresses. Untreated asymptomatic bacteriuria is a risk factor for acute cystitis 40% and pyelonephritis 25-30% in pregnant women.<sup>7</sup> With these objectives in mind the present study was carried out to determine the prevalence of asymptomatic bacteriuria in pregnant women attending the antenatal clinic at Indian Institute of Medical Science

and Research (IIMSR), Warudi, Jalna Further the isolates so obtained were identified by colony morphology and biochemical reactions

## MATERIALS AND METHODS

The present study was carried out in the Department of Microbiology, of IIMSR, Warudi over a period of 3 months from June 2014-August 2014. After obtaining approval from the ethical committee of the institute, informed consent and a detailed history of all the antenatal women was taken regarding age, any presenting symptoms they had, earlier pregnancies, and period of gestation. Symptomatic, catheterized and diabetic women were excluded from the study. They were instructed to take midstream urine samples in a sterile wide mouthed container and two samples so collected from each were examined for

1. Wet mount on uncentrifuged urine to look for pus cells, epithelial cells, any bacteria, casts and RBCs
2. A loopful of uncentrifuged, well mixed urine was placed on a grease free slide and it was air dried. Then, the smear was stained by Gram's stain and was observed under oil immersion. The presence of  $\geq 1$  bacteria/Oil immersion field in 20 fields correlated with the diagnosis of significant bacteriuria of  $\geq 10^5$  CFU/ml of urine<sup>8</sup>
3. Urine was then cultured on Blood and MacConkey agar using a callibrated loop of 4 mm in diameter. After overnight incubation at 37°C for 24 hours on culture plate, if bacterial counts equal or more than  $10^5$  per ml were taken as positive in asymptomatic women. (as per Kass concept of significant bacteriuria)<sup>9</sup>. Samples with less than these colonies were repeated. Samples showing significant growth and with a predominant single isolate were included in the study. The isolates were identified by colony morphology, biochemical reactions and gram stain. The Antibiotic Sensitivity Testing (AST) was performed as per CLSI guidelines. The data was then analyzed statistically.

## RESULTS

Out Of the 206 antenatal women screened only 18 (8.73%) showed significant bacteriuria and the rest 188 were found to be sterile. As shown in table 1 maximum incidence was found to be in the <25 age group.

**Table 1:** Distribution of culture positivity with respect to age of the patient

Culture			
Age	Positive	Negative	P-Value
< 25	15(83.3%)	155(82.5%)	P=0.893*
25-30	3(16.7%)	28(15.0%)	
> 30	0(0%)	5(2.7%)	
<b>Total</b>	<b>18</b>	<b>188</b>	NS

\* Fisher Exact test=0.189; df=2

**Table 2:** Distribution of culture positive cases in relation to gravid state of the patient

Culture			
Gravida	Positive	Negative	P-Value
I	6(33.3%)	60(31.9%)	P=0.992*
II	7(38.9%)	75(39.9%)	
III and Above	5(27.8%)	53(28.2%)	
<b>Total</b>	<b>18</b>	<b>188</b>	NS

\* Chi-Square Test=0.015; df=2

Culture positivity was found to be more in second gravida and second trimester of pregnancy though not statistically significant (table2 and 3)

**Table 3:** Distribution of culture positive cases in relation to period of gestation

Culture			
Period of gestation	Positive	Negative	P-Value
I Trimester	7(38.9%)	37(19.7%)	P=0.079*
II Trimester	8(44.4%)	77(41.0%)	
III Trimester	3(16.7%)	74 (39.4%)	
<b>Total</b>	<b>18</b>	<b>188</b>	NS

\*Chi-Square Test =5.15; df=2

**Table 4:** Comparison of wet mount and gram stain with culture positive cases

Status of culture	Wet mount positive Pus cells >5/HPf	Gram stain positive
Culture positive	18	14
Culture negative	188	25*
<b>Total</b>	<b>206</b>	<b>36</b>

\*Pus cells were found in wet mount but culture was negative indicating sterile pyuria

#Gram stain revealed Gram positive bacilli i.e. lactobacilli which did not grow on routine culture media

Sensitivity and specificity of wet mount was 61.11% and 86.7% and sensitivity and specificity of gram stain was 77.77% and 93.61% respectively. Maximum isolates were found to be *E coli* (38.88%) followed by Coagulase Negative Staphylococcus (33.33%) (Table5)

**Table 5:** Distribution of isolates among culture positive cases

Culture	No of Cases	Percentage
<i>E coli</i>	7	38.88
<i>Enterobacter</i>	1	5.55
<i>Klebsiella</i>	1	5.55
<i>Staphylococcus aureus</i>	2	11.11
Coagulase negative <i>Staphylococcus</i>	6	33.33
<i>Pseudomonas</i>	1	5.55
<b>Total</b>	<b>18</b>	<b>100</b>

**Table 6:** Antibiotic sensitivity pattern of the recovered isolates

Antibiotic	Sensitivity in percentage
Ampicillin	78%
Amoxyclav	72%
Cefuroxime	67%
Cefoxitin	89%
Nitrofurantoin	100%
Amikacin	94%

Sensitivity was seen maximum to nitrofurantoin, followed by amikacin.

## DISCUSSION

UTI may manifest as asymptomatic bacteriuria, acute cystitis or pyelonephritis. UTIs during pregnancy are a common cause of serious maternal and perinatal morbidity; with appropriate screening and treatment, this morbidity can be limited.<sup>10</sup> Hence in the present study all the women attending the antenatal clinics of our rural hospital were screened for asymptomatic bacteriuria. 206 antenatal cases were evaluated of which 18 (8.7%) cases showed significant bacteriuria. Our findings fall within the global prevalence of 0-9.9% as per IDSA<sup>3</sup> and corresponded with that of Lavanya *et al*<sup>11</sup> i.e 8.4%. Gayathree *et al* have reported a prevalence of 6.8%<sup>12</sup> and Jayalaxmi *et al* have noted a prevalence of 7.4%<sup>13</sup> Sentinath *et al* have noted a higher prevalence of 13% in Tamilnadu.<sup>14</sup> When the age group of these women was analysed, it was found that <25 age group had the maximum prevalence of 83.3%. Similar findings were observed by Lavanya *et al*<sup>11</sup> Girishbabu *et al* have reported a higher prevalence in the 26-30 age group (60%).<sup>15</sup> We have reported none of the cases as positive in >30 age group, which could be due to very small sample size in that group. As per our study females having more than one child and those in the second trimester have reported a higher prevalence of 38.9% and 44.4% respectively, though these were not statistically significant. Although various authors have reported a higher prevalence of Urinary tract infection in third trimester and multigravida,<sup>15,7</sup> univariate and multivariate analysis have shown no significant association between parity and the period of gestation.<sup>4,16</sup> Senthinath *et al* have also noted no significant association between the trimester and gravid status of pregnant women<sup>14</sup> When gram stain and wet mount findings were compared with culture, it was found that gram stain was more sensitive and specific than wet mount examination of urine. (table-4) Similar findings have been noted by Gayathree *et al*<sup>13</sup> *E coli* is the most common cause of urinary tract infection (UTI), accounting for approximately 80-90% of cases. It originates from fecal flora colonizing the periurethral area, causing an ascending infection.<sup>2</sup> In our study, predominant isolate was noted as *E coli* (38.88%) followed by Coagulase negative staphylococcus (33.33%).

Enayat *et al*<sup>17</sup> and Sentinath *et al*<sup>14</sup> have also reported the maximum isolate to be *E coli* followed by coagulase negative staphylococcus. Girishbabu *et al*<sup>15</sup> have reported *E coli* as 30% which was slightly less than our findings while Masinde *et al* have reported *E coli* to be 42.7% which was more than ours<sup>16</sup>. Uropathogenic *E. coli* have such virulence factors, known as fimbrias or *pilli*. These are adherence proteins (adhesins) expressed on the bacterial wall surface that promote binding to the epithelium of the vagina and urethra, thus increasing *E. coli* ability to cause UTIs<sup>18</sup> Masinde *et al* have reported *Klebsiella* as 5.5% which corresponded with our finding although this was less than that reported by Pegu *et al* (10.29%)<sup>16</sup> and Enayat *et al* (13.73%)<sup>17</sup> Though *Pseudomonas* was isolated in one of our samples, no possible predisposing factor could be elucidated in that patient. All the isolates were sensitive to Nitrofurantoin followed by Amikacin. Pegu *et al* have also observed maximum sensitivity to nitrofurantoin<sup>7</sup> As these drugs are to be avoided in pregnancy, it is advised to give either penicillins or cephalosporins in pregnancy.

## CONCLUSION

Asymptomatic bacteriuria if left untreated can lead to overt infection in later stages of pregnancy thereby increasing the chances of pyelonephritis and cystitis. Adverse outcomes have also been noted on the fetus which include prematurity, low birth weight, IUGR etc. It is advocated that all antenatal cases should be screened to detect asymptomatic bacteriuria in them so that any untoward complication could be foreseen at an earlier stage and appropriate measures taken to prevent these complications.

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