

International Journal of Biomedical Research

ISSN: 0976-9633 (Online); 2455-0566 (Print)

Journal DOI: <https://doi.org/10.7439/ijbr>

CODEN: IJBRFA

Original Research Article

Prospective analysis of perinatal outcome of pregnant women with asymptomatic bacteriuria**Kamlesh Rajeev Chaudhari^{*1}, Shoma Dey², Kushagra Rajeev Chaudhari³ and Ashwini Satish Sakhalkar¹**¹Department of Obstetrics and Gynaecology, K.J. Somaiya Medical College and Research Centre, Mumbai, Maharashtra, India²Department of Microbiology, K.J. Somaiya Medical College and Research Centre, Mumbai, Maharashtra, India³Department of Paediatrics, K.J. Somaiya Medical College and Research Centre, Mumbai, Maharashtra, India

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Mumbai, Maharashtra, India***Article History:****Received:** 06/04/2017**Revised:** 22/05/2017**Accepted:** 22/05/2017**DOI:** <https://doi.org/10.7439/ijbr.v8i5.4089>**Abstract****Introduction:** Symptomatic bacteriuria is common in pregnant women and if untreated could lead to serious complications. Asymptomatic bacteriuria during pregnancy if left untreated, may lead to acute pyelonephritis, preterm delivery and low birth weight fetus. Adequate and early treatment reduces the incidence of these obstetric complications. The present study was done to determine the prevalence of ASB and obstetric outcome following treatment.**Methods:** A prospective study was conducted at a tertiary care teaching hospital. 200 pregnant women attending antenatal clinic from 1st January 2016 to 30th December 2016 and who agreed to enter the study were clinically evaluated to exclude signs and symptoms of urinary tract infection and were screened for ASB. Women having more than 10⁵ cfu of single organism per ml of urine were diagnosed positive for ASB and treated. They were followed up till delivery for obstetric outcome.**Result:** Out of 200 pregnant women, 32 were diagnosed positive with an overall prevalence of 16.6 %. The highest age specific prevalence was found in the 26 to 35 years age group (73.68%), and the lowest in the 18 to 25 years age group (26.31%). There was increase in incidence with increased parity. The dominant bacterial isolates were *Escherichia coli* (56.2%) and the least common was *Pseudomonas* (3.1%). Most isolates were sensitive to nitrofurantoin, cefuroxime and gentamicin. Out of the 32 patients, PROM was observed in 43%, preeclampsia in 25%, IUGR in 20%, low birth weight in 15%, preterm delivery in 9.3% and anemia in 9.3%**Conclusion:** Early detection and treatment of ASB during pregnancy prevents complication like pre eclampsia, IUGR, preterm delivery, PROM and low birth weight. Therefore screening and treatment of ASB may be incorporated as routine antenatal care for safe motherhood and healthy newborn.**Keywords:** UTI- urinary tract infection, ASB- asymptomatic bacteriuria, cfu- colony forming units, PROM- premature rupture of membranes, IUGR- intrauterine growth restriction.**1. Introduction**

Urinary tract infection is a major cause of morbidity and implies the presence & multiplication of bacteria in the urinary tract which may or may not associate with clinical disease. To reliably distinguish true bladder bacteriuria from contamination during voiding, the concept

of significant bacteriuria was introduced by Kass & defined as presence of at least 10⁵ cfu of same species of microorganisms per ml of urine on culture of sample in absence of clinical symptoms. Thus, urine culture is the

gold standard screening technique for asymptomatic bacteriuria during pregnancy

The incidence ranges from 2% to 10% during pregnancy. Screening for and treatment of asymptomatic bacteriuria in pregnant women is found to be beneficial as it has been seen that if left untreated, 20 – 30% of these bacteriuric women develop acute pyelonephritis later in pregnancy. Asymptomatic bacteriuria and acute pyelonephritis in late pregnancy are associated with prematurity, fetal growth restriction and neonatal death. Treatment of ASB early in pregnancy decreases the incidence of pyelonephritis to 2-3%, a 90% reduction.

Asymptomatic bacteriuria may precede symptomatic UTI in individuals with predisposing factors such as elderly, pregnant, children with anatomical defects of urinary tract, diabetes mellitus or those who have urinary catheters.

Various anatomical and physiological changes include dilatation of the renal pelvis & ureters in as early as 8th week of pregnancy, displacement of bladder itself superiorly & anteriorly, smooth muscle relaxation induced by progesterone leading to decreased peristalsis of ureters and urinary stasis due to increased bladder capacity.[1] Other factors include pregnancy induced glycosuria and aminoaciduria.

Thus, the present study was undertaken to know the prevalence of disease and its association with maternal and fetal complications like preterm delivery, anemia, low birth weight, pregnancy induced hypertension and PROM.

2. Material methods

This prospective study was undertaken at a tertiary care hospital from 1st January 2016 to 30th December 2016. A total of 200 asymptomatic pregnant women attending antenatal clinic were enrolled after obtaining informed written consent. The study and data collection were carried out with approval from the institutional ethical committee. Those who agreed to enter the study were clinically evaluated to exclude signs and symptoms of urinary tract infections (frequency, urgency, dysuria), pregnancy induced hypertension, diabetes mellitus, history of antibiotic intake in previous 2 weeks, pyrexia. With the aid of questionnaire, demographic features including age, parity and gestational age of pregnancy were collected. Patients were instructed on the correct mode of self collection of urine sample and the importance of clean catch sample of urine. They were provided with wide mouth sterile capped universal bottles. Samples of 10 to 15 ml of urine were obtained. It was microscopically examined for pus cells, epithelial cells, bacteria, ova and yeast like cells as per standard protocol.

Urine samples were cultured immediately. Culture of microorganisms in urine was done on MacConkey agar and blood agar using standard loop (Semi quantitative method). The plates were read after 24 hours of aerobic incubation at 37° C. They were incubated for another 24 h before a negative report was issued. Urine samples yielding bacterial growth of 10⁵ cfu per ml or more of pure isolates were deemed significant. Isolates were identified to species level using standard method and their antimicrobial sensitivities were done using drugs safe in pregnancy, namely amoxicillin, ampicillin, cephalixin, cefuroxime, cefotaxime, amikacin, gentamicin and nitrofurantoin. Urine samples producing non significant and mixed growths were not processed.

All the women having more than 10⁵ cfu of single organism per ml of urine were diagnosed positive for ASB and treated. They were followed up till delivery for obstetric outcome. Relative risk with 95% significance interval were used to describe association between ASB and outcome. Women diagnosed of having ASB on the basis of urine culture report were treated as per antibiotic sensitivity for 7 days. Clearance of bacteria was documented after the therapy was completed. The follow up culture was done 1 week after the completion of therapy. All women in whom infection persisted were given repeat course of antibiotics as per sensitivity report and clearance of infection was documented.

3. Results

Among 200 pregnant women, 32 were found to have asymptomatic bacteriuria with a prevalence of 16.6%. In our study significant growth was found in (16.6%) cases and (83.4%) samples were sterile. These results were consistent with reports of the recent studies.[2,4,7]

Demographic profile of women with ASB.

Table 1: Age distribution of patients with ASB

Age (years)	No. of patients with ASB	Percentage
20 to 25	8	25
26 to 30	10	31.2
31 to 35	7	21.8
More than 35	7	21.8
Total	32	100

Table 2: Trimester wise distribution of patients with ASB

Trimester	No. of patients with ASB	Percentage
1 st	7	21.8
2 nd	17	53.1
3 rd	8	26.1
Total	32	100

Table 3: Parity wise distribution of patients with ASB

Parity	No. of patients with ASB	Percentage
Primigravida	14	43.7
Multigravida	18	56.3
Total	32	100

Among 32 patients, 43.7% were primigravida and 56.3% were multigravida. Highest incidence of ASB was reported in age group 26 to 30 years and more than half of the cases were found in second trimester.

Table 4: Maternal and fetal outcome

Obstetric outcome	No. of patients with ASB	Percentage
PROM	14	43.7
Preeclampsia	8	25
IUGR	6	18.7
Low birth weight	5	15.6
Anemia	3	9.3
Preterm labour	3	9.3

Table 5: Causative organism and its incidence in the present study

Organism	No. of patients with ASB	Percentage
<i>Escherichia coli</i>	18	56.2
<i>Klebsiella spp</i>	7	21.8
<i>Staphylococcus aureus</i>	5	15.6
<i>Proteus mirabilis</i>	1	3.2
<i>Pseudomonas aeruginosa</i>	1	3.2
Total	32	100

Escherichia coli was found to be the most common pathogen affecting 56.2% women followed by *Klebsiella spp* with 21.8% with *Staphylococcus aureus* in 15.6%. Antimicrobial sensitivity of Nitrofurantoin against *Escherichia coli* was documented 94% while 100% sensitivity for this antibiotic was reported against *Staphylococcus aureus* and *Klebsiella spp*. Overall nitrofurantoin was reported to be highly sensitive (more than 90 to 100%) against all strains except *Pseudomonas spp*.

Table 6: Sensitivity of gram negative organisms

Antibiotic	<i>Escherichia coli</i>	<i>Klebsiella spp</i>	<i>Proteus mirabilis</i>	<i>Pseudomonas aeruginosa</i>
Gentamycin	100%	100%	100%	-
Amikacin	100%	100%	100%	-
Nitrofurantoin	94%	100%	-	-
Imipenem	88%	100%	100%	-
Cefotaxime	55%	80%	-	100%
Ceftriaxone	55%	100%	100%	100%
Amoxiclav	100%	100%	-	-
Piperacillin + Tazobactam	-	-	-	100%
Aztreonam	-	-	-	100%
Carbencillin	-	-	-	100%

Table 7: Sensitivity of gram positive organism – *Staphylococcus aureus*

Antibiotic	No. of patients with positive culture	Percentage sensitivity
Amikacin	7	100%
Clindamycin	7	100%
Cefotaxime	7	100%
Nitrofurantoin	7	100%

Women exposed to antepartum urinary tract infection had high incidence of premature labour, preeclampsia, PROM, anemia, low birth weight and IUGR.

4. Discussion

In our study the overall prevalence of ASB was observed to be 16.6%. Various other Indian studies have shown the prevalence rate between 8.4 to 26%. In the present study ASB was observed in 21.8% in the 1st trimester, 53.1% in the 2nd trimester and 26.1% in the 3rd trimester. Thus approximately half of the cases (17/32) were in the 2nd trimester. In a study by Kashinath *et al* more than half of the cases (68%) were in the 2nd trimester.[2] Bacterial isolates in the urine have been found to be changing from time to time from place to place.

Most common organism isolated was *Escherichia coli* (56.2%) followed by *Klebsiella spp* (21.8%), *Staphylococcus aureus* (15.6%). The results were in accordance with the study of Kashinath *et al* where the commonest bacterial isolates were *Escherichia coli* (63.6%) followed by *Klebsiella spp* (18.18%) and *staphylococcus aureus* (13.64%). In the study by Jain *et al*, *Escherichia coli* was detected in 41 (37.6%) women and was the most frequently isolated organism followed by *Enterococcus spp*. in 23 (21.1%) of the cases. Other bacteria isolated were *Staphylococcus aureus*, *Klebsiella spp*, *Proteus mirabilis*, coagulase negative *Staphylococcus*, *Pseudomonas spp* and *Acinetobacter*. This pattern could be due to the fact that urinary stasis is common in pregnancy and since most *Escherichia coli* strains prefer that environment, they cause UTI. Also *Escherichia coli* readily colonize and can penetrate the urinary tract endothelium. Another reason could be as a result of poor genital hygiene practices by pregnant women who may find it difficult to clean their anus properly after defecating or clean their genitalia after passing urine.[3] The upsurge in antibiotic resistant pattern seen in this study could be due to antibiotic abuse and self medication being practiced in many developing countries including India. Also low cost and availability of these drugs could be another contributing factor for antibiotic resistance in this locality. In the present study, we observed that pregnant women with ASB are at an increased risk of maternal and fetal outcomes like preterm delivery, PROM,

anemia, IUGR, low birth weight, preeclampsia consistent with the observations made by Jain *et al.*[4]

5. Conclusion

Our analysis shows that the association observed between UTI and adverse perinatal outcome and maternal morbidity may be influenced by other confounding factors like age, parity and other associated medical and obstetrics factors. About 1/5th of the pregnant females suffer from asymptomatic bacteriuria in the study area, which is quite high. We also observed that pregnant women with ASB are at an increased risk for adverse maternal and fetal outcomes. We thus recommend that routine screening and treatment with ASB should be carried out on all antenatal patients in order to identify any unsuspecting infection. Besides this health education on personal hygiene should be imparted in the antenatal clinic. These measures will go a long way in reducing maternal and obstetric complication associated with ASB.

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