

A prospective observational study on asymptomatic bacteriuria in pregnancy & its effects on maternal & perinatal outcome

K. Mounika, Pramila Gupta* and Parveen Yousuff

Department of Obstetrics & Gynecology, Shifaa Hospital, #332, Dar-Us-Salam Building, Queens Road, Bengaluru-560052, Karnataka, India

Received: 10th September 2024; **Accepted:** 25th December 2024; **Published:** 01st January 2025

Abstract: *Background:* Urinary tract infections (UTI) continue to be one of the most common medical conditions complicating pregnancy, with a prevalence of approximately 20%. UTI include asymptomatic bacteriuria (ASB), cystitis & pyelonephritis. The prevalence of ASB is 2% to 10% of cases. ASB prevalence and its maternal & perinatal outcomes are analysed in this study. *Aim:* To study the maternal and perinatal outcome of asymptomatic bacteriuria in pregnancy. *Materials and Methods:* This is prospective observational study done among 100 women with asymptomatic bacteriuria in pregnancy in Department of obstetrics & Gynecology, Shifaa hospital, Bangalore. Various adverse outcomes in pregnant women & neonates are observed as variables and their incidences were calculated. *Results:* In the present study the incidence of asymptomatic bacteriuria was observed to be more among 23 to 26 yrs, primigravida with gestational age of 12-24 weeks. Maternal & perinatal morbidities like pre eclampsia, anemia were more common and 28% of births were low birth weight i.e. <2.5 kg at birth who needed close monitoring in NICU. Majority of the study population underwent normal vaginal delivery. Antibigram was found to be E coli, klebsiella and Staphylococcus aureus. *Conclusion:* Asymptomatic bacteriuria if left untreated will progress into symptomatic urinary tract infections and pyelonephritis which have an adverse maternal and fetal outcome. Early detection and treatment of ASB can prevent the adverse outcomes which can be achieved by routine screening for ASB in all antenatal patients as early as possible.

Keywords: Asymptomatic Bacteriuria, Maternal & Perinatal Morbidity, Low Birth Weight.

Introduction

Urinary tract infections (UTI) continue to be one of the most common medical conditions complicating pregnancy, with a prevalence of approximately 20% [1]. A UTI is diagnosed when there is an overgrowth of bacteria in the urinary tract ($\geq 10^5$ counts/mL of urine), irrespective of the presence of clinical symptoms [2]. UTI include a spectrum of disorders, ranging from those affecting the lower urinary tract, like asymptomatic bacteriuria (ASB), cystitis & pyelonephritis. The prevalence of ASB is 2% to 10% of cases [3].

ASB had a 20% to 30% risk of progressing into pyelonephritis with early diagnosis and adequate treatment with antibiotics helped to reduce the risk by 80% [4]. Organisms causing UTI in women (whether pregnant or not) are of the same species and virulence factors. Escherichia coli,

Klebsiella pneumonia, Proteus, Acinetobacter, Staphylococcus saprophyticus, Group B Streptococcus (GBS), and Pseudomonas aeruginosa [5-6].

Advanced maternal age, multiparity, sexual intercourse, diabetes, sickle cell anemia, previous history of UTI, immunodeficiency, and urinary tract abnormalities are risk factors for UTI in pregnancy. UTI in pregnancy is considered a risk factor for adverse maternal and perinatal outcomes. An increased association of UTI with premature labor, hypertensive disorders of pregnancy, anemia, amnionitis [6] and low birth weight (LBW) infants. Adequate diagnosis and treatment of urogenital infections during the pregnancy is necessary. Hence the study was conducted to study the maternal and perinatal outcome of asymptomatic bacteriuria in pregnancy.

Urinary tract changes in pregnancy:

| | |
|-------------------|---|
| Kidneys: | Increased renal length Increased glomerular filtration rate by 30%-50% |
| Collecting System | Decreased peristalsis |
| Ureters: | Decreased peristalsis Mechanical obstruction |
| Bladder: | Displaced anteriorly and superiorly Smooth muscle relaxation, increased capacity |

Aim: To study the maternal and perinatal outcome of asymptomatic bacteriuria in pregnancy

Objectives:

1. To study the maternal outcome with ASB in pregnancy.
2. To study the perinatal outcome with ASB in pregnancy.
3. To know the affiliation of Bacteriuria with age, parity and socioeconomic status.

Material and Methods

Source of data: A total number of 100 cases of pregnant women attending obstetrics OPD at Shifaa Hospital, Bangalore City, from July 2022 to till July 2023, were taken in this study after obtaining clearance from Hospital Ethical Committee.

Inclusion Criteria: Pregnant women of age from 18 to 40 years of all three trimesters attending antenatal clinic irrespective of parity with no signs & symptoms of UTI and planning to get delivered at our hospital.

Exclusion Criteria: H/O Diabetes, heart disease, History of urolithiasis, preterm delivery, PROM, Known case of renal disease or renal anomalies, Multiple pregnancy, hydramnios and Who has taken antibiotic therapy recently (within 7 days) were excluded from this study.

Method of Collection of Data: Detailed history including demographic details, obstetric history, menstrual history, personal history, past illness will be taken, complete general physical and

systemic examination and urine routine examination along with routine obstetrical investigations. Midstream clean catch early morning sample was collected in a sterile containers and sent to laboratory immediately or within 2 hrs of collection, sample was tested for routine microscopy and presence of nitrite and leucocyte esterase by dipstick method. Urine routine examination [URE] will be taken as positive if it contains more than 8 pus cells / HPF [12] or 4 – 8 pus cells with positive leukocyte esterase and nitrites and will be advised for urine culture and sensitivity.

Mac conkey agar, blood agar and Sabouraud dextrose agar plate were used for culture. incubation was done at 37°C for aerobic culture for 24 hrs and anaerobic culture for 72 hrs, specimen with 10⁵ or more bacteria per ml were considered to have significant bacteriuria. Urine culture positive patients will be taken as a case, treatment will be advised as per culture & sensitivity report. All these patients will be followed up till delivery, puerperium and perinatal period. Pregnancy and perinatal outcome will be noted and analyzed.

Results

In the present study the incidence of asymptomatic bacteriuria was observed to be more among 23 to 26 years of age group, more among primigravida, 12-24 weeks gestational age and more in in upper lower class [table1].

Maternal & perinatal morbidity is more like 22% were diagnosed as pre eclampsia, 41% as anemia [table 2] 28% were low birth weight i.e. <2.5 kg at birth. In antibiogram 76% were found to be E coli, 14% were klebsiella and 10% were Staphylococcus aureus.

Maternal & perinatal outcome is 28% were low birth weight i.e. <2.5 kg at birth, pre term deliveries were 27 % and majority of the study population underwent normal vaginal delivery followed by cesarean and instrumental delivery [table 3].

| Parameters | Variables | Frequency | Percentage |
|-----------------------|--------------------|-----------|------------|
| Age in years | 18 – 22 | 16 | 16 % |
| | 23 – 26 | 47 | 47 % |
| | 27 – 30 | 22 | 22 % |
| | 31 – 35 | 15 | 15 % |
| Parity | Primigravida | 53 | 53% |
| | Multigravida | 47 | 47% |
| Gestational Age | 12-24 weeks | 56 | 56 % |
| | 24-32 weeks | 32 | 32 % |
| | 32-36 weeks | 12 | 12% |
| Socio economic status | Upper class | 14 | 14 % |
| | Upper middle class | 26 | 26% |
| | Middle class | 22 | 22% |
| | Upper class | 34 | 34% |
| | Lower classes | 4 | 4% |

| | | Frequency | Percentage |
|--------------------------|-----|-----------|------------|
| Pre- eclampsia | Yes | 22 | 22 % |
| | No | 78 | 78 % |
| Anemia [Hb : <11 gm/dl] | Yes | 41 | 41 % |
| | No | 59 | 59 % |

| Parameters | Variables | Frequency | Percentage |
|-----------------------------|-------------------------|-----------|------------|
| Mode of delivery. | Normal vaginal delivery | 61 | 61% |
| | Instrumental | 8 | 8% |
| | C Section | 31 | 31% |
| Gestational age at delivery | Term | 73 | 73 % |
| | Preterm | 27 | 27 % |
| Low birth weight | Yes | 28 | 28% |
| | No | 72 | 72% |

Discussion

Asymptomatic bacteriuria (ASB) is the existence of bacteria when urine of a person with no symptoms of a urinary tract infection (UTI) is collected [7]. It is also defined as the existence of bacteria that are actively multiplying and >10⁵ cfu per mL of urine within the urinary tract, excluding the urethra, when the patient does not have any symptoms of a UTI [8]. Although few infants and toddlers have ASB, women are at high risk compared to men, and risks increase with age [9].

Most patients who are diagnosed with ASB may not develop symptomatic UTIs and not have adverse consequences. But pregnant women undergo anatomical and physiological changes in the urinary tract, and their immune system too undergoes changes during pregnancy, resulting in an increase in the risk of ASB [10]. In about 70% of the cases, ASB is a major risk factor for the occurrence of UTIs in women while they are pregnant [11].

During pregnancy, ASB increases the possibility of the case progressing to UTI with symptoms, which may further lead to pyelonephritis and obstetric outcomes that are adverse in nature and may result in

premature delivery, low weight at birth, and increased foetal mortality. In addition, pre-eclampsia, anaemia, intrauterine growth retardation, preterm labour, preterm premature rupture of the membranes, and post-partum endometritis [12] may also occur due to ASB. There is sufficient evidence suggesting that a pregnant woman with ASB should be treated [13-14].

Researchers suggest a regular culture screening for all pregnant women presenting themselves to antenatal clinics due to the adverse effects of undiagnosed ASB in the mother and child [15] and also to prevent the mother and newborn child from any further complications likely to occur due to infection. Urine Culture still is the best standard screening technique for identifying ASB. However, in many countries including India and other developing countries, it is uncommon to conduct a routine urine culture test for an antenatal patients. The primary reason for this practice being the time factor for culture results and the cost involved (usually a period of 48 hr is needed for culture result), it is instead normal practice to go for the strip urinalysis for finding the presence of glucose and protein content [16]. Globally, the existence of ASB has been reported to be between 2–10% [17].

Financial Support and sponsorship: Nil

But various studies show prevalence higher than this, such as 25.3% in Odisha, 17% in Andhra Pradesh [18], 17% in Lucknow, and 23.9% in Nigeria.

Conclusion

Asymptomatic bacteriuria is more common in females especially in pregnancy. If left untreated it will progress into symptomatic urinary tract infections and pyelonephritis. Pyelonephritis has an adverse maternal and fetal outcome. Early detection and treatment of asymptomatic bacteriuria can prevent the adverse outcomes which can be achieved by routine screening for asymptomatic bacteriuria in all antenatal patients as early as possible. Urine culture is always considered to be the gold standard diagnostic test for detection of bacteriuria. Appropriate antibiotic therapy according to the sensitivity pattern can prevent development of resistance to antibiotics.

Acknowledgement

Authors would be grateful to all participants who were involved in the study and thankful to fellow doctors of Shifaa hospital for their extent of support.

Conflicts of interest: There are no conflicts of interest.

References

1. Yan L, Jin Y, Hang H, Yan B. The association between urinary tract infection during pregnancy and preeclampsia: A meta-analysis. *Medicine (Baltimore)*. 2018; 97(36):e12192.
2. Taghavi Zahedkalaei A, Kazemi M, Zolfaghari P, Rashidan M, Sohrabi MB. Association between Urinary Tract Infection in the First Trimester and Risk of Preeclampsia: A Case- Control Study. *Int J Womens Health*. 2020; 12:521-526.
3. Stein G, Fünfstück R. Asymptomatische Bakteriurie [Asymptomatic bacteriuria]. *Med Klin (Munich)*. 2000; 95(4):195-200.
4. Nicolle LE. Management of asymptomatic bacteriuria in pregnant women. *Lancet Infect Dis*. 2015; 15(11):1252-1254.
5. Emamghorashi F, Mahmoodi N, Tagarod Z, Heydari ST. Maternal urinary tract infection as a risk factor for neonatal urinary tract infection. *Iran J Kidney Dis*. 2012; 6(3):178-180.
6. Schieve LA, Handler A, Hershov R, Persky V, Davis F. Urinary tract infection during pregnancy: its association with maternal morbidity and perinatal outcome. *Am J Public Health*. 1994; 84(3):405-410.
7. Givler DN, Givler A. Asymptomatic Bacteriuria. [Updated 2023 Jul 17]. In: StatPearls [Internet]. Treasure Island (FL). *Stat Pearls Publishing*. 2024. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441848/>
8. Jayalakshmi J, Jayaram VS. Evaluation of various screening tests to detect asymptomatic bacteriuria in pregnant women. *Indian J Pathol Microbiol*. 2008; 51(3):379-381.
9. Tadesse S, Kahsay T, Adhanom G, Kahsu G, Legese H, G/Wahid A et al Correction to: prevalence, antimicrobial susceptibility profile and predictors of asymptomatic bacteriuria among pregnant women in Adigrat General Hospital, Northern Ethiopia. *BMC Res Notes*. 2018; 11(1):798.
10. Azami M, Jaafari Z, Masoumi M, Shohani M, Badfar G, Mahmudi L et al. The etiology and prevalence of urinary tract infection and asymptomatic bacteriuria in pregnant women in Iran: asystematic review and meta-analysis. *BMC Urol*. 2019; 19(1):1-15.

11. Ullah MA, Barman A, Siddique MA, Haque AK. Prevalence of asymptomatic bacteriuria and its consequences in pregnancy in a rural community of Bangladesh. *Bangladesh Med Res Counc Bull.* 2007; 33(2):60-64.
12. Jain V, Das V, Agarwal A, Pandey A. Asymptomatic bacteriuria & obstetric outcome following treatment in early versus late pregnancy in north Indian women. *Indian J Med Res.* 2013; 137(4):753-758.
13. Wullt B, Sundén F, Grabe M. Asymptomatic bacteriuria is harmless and even protective: don't treat if you don't have a very specific reason. *Eur Urol Focus.* 2019; 5(1):15-16.
14. Averbek MA, Rantell A, Ford A, Kirschner-Hermanns R, Khullar V, Wagg A et al. Current controversies in urinary tract infections: ICI-RS 2017. *Neurourol Urodyn.* 2018; 37(S4):S86-S92.
15. Moore A, Doull M, Grad R, Groulx S, Pottie K, Tonelli M et al. Recommendations on screening for asymptomatic bacteriuria in pregnancy. *CMAJ.* 2018; 190(27):E823-E830.
16. Imade PE, Izekor PE, Eghafona NO, Enabulele OI, Ophori E. Asymptomatic bacteriuria among pregnant women. *N Am J Med Sci.* 2010; 2(6):263-266.
17. Delzell JE, Lefevre ML. Urinary tract infections during pregnancy. *Am Fam Physician.* 2000; 61(3):713-721.
18. Prasanna B, Naimisha M, Swathi K, Shaik MV. Prevalence of asymptomatic bacteriuria in pregnant women, isolates and their culture sensitivity pattern. *Int J Curr Microbiol Appl Sci.* 2015; 4(8):28-35.

Cite this article as: Mounika K, Gupta P and Parveen Y. A prospective observational study on asymptomatic bacteriuria in pregnancy & its effects on maternal & perinatal outcome. *Al Ameen J Med Sci* 2025; 18(1):71-75.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial (CC BY-NC 4.0) License, which allows others to remix, adapt and build upon this work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

*All correspondences to: Dr. Pramila Gupta, Senior Consultant, Department of Obstetrics & Gynecology, Shifaa Hospital, #332, Dar-USalam Building, Queens Road, Bengaluru-560052, Karnataka, India. E-mail: pramilag54@gmail.com