International Journal of Research in Medical Sciences
Meshram PS et al. Int J Res Med Sci. 2023 Jul;11(7):2616-2620
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20232109

Original Research Article

Asymptomatic bacteriuria in pregnancy screening, risk factors, diagnosis and treatment

Pallavi S. Meshram[1], Ashish R. Kubde[1], Vijayalakshmi S. Kothalkar[1], Avinash B. Giri[2]*

[1]Department of Obstetrics and Gynaecology, Seven Star Hospital, Nagpur, Maharashtra, India
[2]Medical Officer, Mechanised Infantry Regiment Centre (MIRC), Ahmednagar, Maharashtra, India

Received: 18 May 2023
Revised: 09 June 2023
Accepted: 17 June 2023

***Correspondence:**
Dr. Avinash B. Giri,
E-mail: avisai143@gmail.com

ABSTRACT

Background: Asymptomatic bacteriuria is a frequent pregnancy issue that, if left untreated, increases the risk of premature birth and pyelonephritis. Urine culture is the basis for the diagnosis. In the current study, 200 pregnant women are examined for severe asymptomatic bacteriuria to gain insight into its frequency in emerging nations, to re-evaluate some predisposing factors, and to test for the susceptibility of specific aetiological agents. The purpose of this study was to assess the prevalence of asymptomatic bacteriuria in pregnant women as well as to isolate, characterise, and establish the pathogens antibiotic susceptibility patterns.
Methods: 200 pregnant women with asymptomatic bacteriuria are included in the study. By using traditional techniques, isolates were located, and their antibiotic susceptibility patterns were established.
Results: Significant bacteriuria was detected in 102 individuals (51%) in total. The three most efficient antibiotics against the urine isolates were determined to be Piperacillin-Tazobactam, Amikacin, and Nitrofurantion. Escherichia coli was the most prevalent bacterium, followed by Klebsiella pneumoniae.
Conclusions: In the group under study, prenatal patients frequently have asymptomatic bacteriuria. All prenatal patients should have routine urine cultural testing to detect any undetected infections. This action will significantly lessen pregnancy-related maternal and obstetric problems.

Keywords: Asymptomatic bacteriuria, Pregnancy, Urinary infection, Urine culture

INTRODUCTION

Bacteria present in urine without any clinical symptoms or indicators of a urinary infection in the host is known as Asymptomatic Bacteriuria or Asymptomatic urinary infection. The microbiologic definition typically refers to the same organism or organisms present in two consecutive urine tests at a concentration of greater than or equal to 105 colony forming units per millilitre.[1] Asymptomatic bacteriuria affects 2–10% of pregnant women worldwide.[2] The national collaborating centre for women's and children's health in the UK recommends routine screening for asymptomatic bacteriuria (ABU) by midstream urine culture early in pregnancy for healthy pregnant women.[3] Over 6 million outpatient visits each year are due to symptomatic urinary tract infections, which are preceded by asymptomatic bacteriuria and are characterized by dysuria, frequency, pain, and fever.[4] In pregnancy, 13-27% of untreated women with asymptomatic bacteriuria develop pyelonephritis, which typically requires hospitalization for treatment.[5] In randomized, controlled trials, treatment of pregnant women with asymptomatic bacteriuria has reduced the incidence of preterm birth and low birth weight infants.[6] This study aims to determine the prevalence of asymptomatic bacteriuria in pregnancy and its etiological agents.

METHODS

Prospective, randomized study with 200 pregnant women between 1st November 2022 and 31st March 2023 at Department of Obstestrics and Gynaecology, Tertiary Care Hospital, Nagpur, Maharashtra, India.

Age, occupation, address, gestational age, number of children, prophylactic use of antibiotics, and prior obstetrics and gynaecology complications were all collected.

Inclusion criteria

Mothers were willing for participation. Had no high-risk factors in pregnancy. Had no recent medical illness or Urinary tract infection.

Exclusion criteria

Those with symptoms of a urinary tract infection (UTI) (dysuria, frequency, and urgency, etc.). Those who had taken antibiotics within the previous seven days. Those who had experienced vaginal bleeding or complications during pregnancy. Those who had known congenital urinary tract anomalies.

Specimen collection

The proper way to collect clean midstream urine into sterile containers was explained to qualified women. Their perineums were then washed with soap, rinsed with fresh water, and dried with sterile cotton after hand washing. Within 30 minutes of collection, randomly voided, clean-catch midstream pee was collected into sterile containers and forwarded to the lab for urine culture.

Culture and Sensitivity

Blood and Mac Conkey agar were used to create a urine culture, which was read at 12, 24, and 72 hours after 24-48 hours of incubation at 35°-37°. Bacteriuria was diagnosed when there were more than 105 colony-forming units of a single kind of bacteria per milliliter of urine.[7]

According to susceptibility tests, pregnant women with positive urine cultures received a single course of the proper antibiotics. One week after the end of treatment, they were requested to return for a second urine culture in order to assess the effectiveness of the therapy.

RESULTS

Our study shows highest positive culture cases among pregnant women in the age group 18-20 years (25%). This was closely followed by 21-35 (20%) and >35 (6%) respectively. The younger patient among the case studied was 18 yrs old and oldest was >35 yrs old (Table 1).

Table 1: Distribution of culture positive cases according to age.

Age groups in years	Positive culture cases	Negative culture cases	Percentage
18-20	50	30	25%
21-35	40	60	20%
>35	12	8	6%
Total	102	98	51%

Our study shows highest culture positive cases in labourer pregnant patients around 25% and lowest around 4% cases found in pregnant patients doing government service (Table 2).

Table 2: Distribution of culture positive cases according to occupation.

Occupation	Positive culture cases	Negative culture cases	Percentage
Housewife	24	6	12%
Labourer	50	20	25%
Farmer	40	20	20%
Government service	8	12	4%
General employee	10	10	5%
Total	132	68	66%

Table 3: Distribution of culture positive cases with respect to socioeconomic status (Modified Kuppu-swamy scale).

Socioeconomic status (modified Kuppuswamy scale)	Positive culture cases	Negative culture cases	Percentage
Upper class	2	8	1%
Upper middle	8	12	4%
Lower middle	20	10	10%
Upper lower	25	15	12.5%
Lower	60	40	30%
Total	115	85	57.5%

Table 4: Distribution of culture positive cases with respect to education.

Education	+ve culture cases	-ve culture cases	Percentage
Uneducated	35	15	17.5%
Primary school	30	20	15%
Higher secondary school	20	50	10%
Graduate	10	20	5%
Total	95	105	47.5%

With respect to the socioeconomic status our study shows highest culture positive cases in lower class patients (30%) and lowest found in upper class patients (1%) according to modified Kuppuswamy scale (Table 3).

Similarly, we found uneducated patients having highest culture positive cases around 17.5% and lowest in graduate patients around 5% (Table 4).

According to gravida status culture positive patients found highest in third gravida (15%) followed by second gravida and primigravida (12.5%) (Table 5).

Table 5: Distribution of culture positive cases according to gravida status.

Gravida status	Positive culture cases	Negative culture cases	Percentage
1	25	15	12.5%
2	25	35	12.5%
3	30	40	15%
Total	100	100	50%

Table 6: Distribution of culture positive cases according to pregnancy trimester.

Pregnancy trimester	+ve culture cases	-ve culture cases	Percentage
First	25	45	12.5%
Second	30	20	15%
Third	60	20	30%
Total	115	85	57.5%

Risk of culture positive cases increases with respect to pregnancy trimester. Higher the trimester, greater the risk. Third trimester having 30% positive cases followed by second trimester having 15% cases followed by first trimester 12.5% culture positive cases (Table 6).

Table 7: Distribution of culture positive cases with respect to isolated bacteria.

Isolated bacteria	+ve culture cases	-ve culture cases	Percentage
Escherichia coli	40	28	20%
Klebsiella pneumonia	20	30	10%
Proteus mirabili	20	10	10%
Pseudomonas aeruginosa	10	9	5%
Staphylococcus aureus	6	2	3%
Staphylococcus saprophytics	4	4	2%
Enterococcus faecalis	2	5	1%
Total	102	98	51%

In Table 7 Coliforms were the most common pathogens associated with asymptomatic bacteriuria in our study. Among coliforms Escherichia coli is reported to be the commonest (20%) followed by Klebsiella pneumonia (10%) and Proteus mirabilis (10%).

The bacteria displayed the sensitivity to the following drugs, Imipenem (100%), Pipercillin-Tazobactum (100%), Amikacin (85%), Nitrofurantion (68%), Ceftazidime (62%), Cefotaxime (62%), Co-trimoxazole (50%), Amoxicillin- Clavulanic acid (50%), Norfloxacin (49%), Ciprofloxacin (48%), Erythromycin (41%), and Ampicillin (11%).

DISCUSSION

All age groups are affected by urinary tract infections, but pregnant women are particularly affected more than males and females without pregnancy.[8] Also, bacteriuria in pregnancy more common in younger age group. This creates a definite tendency to the development of symptomatic UTI, which poses risk to the mother and foetus. Preventing complications like pyelonephritis, premature labour, hypertension, preeclampsia, and septicaemia during pregnancy requires treating asymptomatic bacteriuria.[9] Asymptomatic bacteriuria was more common in pregnant labourer patient, and those with lower socioeconomic status, and pregnant women without education. Multiparity was reported as a risk factor related to ABU in pregnancy.[10,11] In addition, occurrence of bacteriuria during pregnancy increases with trimester, which agrees with the work of Stenqvist et al.[12] Significant bacteriuria suggests the importance of a microbiological culture to confirm a UTI diagnosis. We found a consistent risk of asymptomatic bacteriuria in all 3 trimesters of the pregnancy, necessitating a screening programme over the entire conception period but most cases of asymptomatic bacteriuria were found during 3rd trimester (30%) of pregnancy. This result correlates with the other studies.[13] We recommended a urine culture in each trimester to identify most cases because a single urine culture before 20 weeks' gestation missed more than one-half the asymptomatic bacteriuria cases.[14] Since most Escherichia coli bacteria favour that environment, urinary stasis, which is frequent during pregnancy, results in UTI. Another factor can be due to poor genital hygiene habits among pregnant women, who might find it challenging to adequately wipe their anus after faeces or their genital after passing pee.[15] The pattern of antibiotic sensitivity and resistance differs from hospital to hospital and from community to community. This is due to the emergence of resistance bacteria brought on by the careless use of antibiotics. Imipenem and Pipercillin-Tazobactum sensitivity for the isolates in our investigation was 100 %. Amikacin showed the highest level of sensitivity (85%) among the Aminoglycosides. Comparing Nitrofurantoin (68%) to Ceftazidime (62%) and Cefotaxime (62%), sensitivity to the drug was found to be higher. The least sensitive drug was found to be ampicillin (11%). With other research, our Antibiogram pattern correlates.[8,15,16]

Self-medication and antibiotic abuse may be to blame for the rise in antibiotic resistance patterns. Antibiotic resistance may also be influenced by the affordability and accessibility of medications.

Our study has certain limitations such as, the precision of documentation limits the ability to determine urine symptoms, hence the frequency of asymptomatic bacteriuria may have been overstated. Similarly, this study cannot assess the risk of asymptomatic bacteriuria on mode of delivery and on fetal outcome.

CONCLUSION

In this study, around 51% of pregnant women had asymptomatic bacteriuria. Urine culture using clean-catch sample from midstream urine is one of the most sensitive tests for its identification. Regarding the prevalence of asymptomatic bacteriuria in pregnant women under the age of 20, it is advised to include a urine culture in routine examinations of the pregnant women and to fully inform them of the risks of pregnancy at younger ages. Giving pregnant patients special attention is one of the most crucial aspects of the healthcare system. The progression of bacteriuria from asymptomatic to symptomatic is accelerated during pregnancy, which increases the risk of adverse obstetric outcomes like prematurity, low birth weight, and higher rates of fetal mortality. These outcomes include hypertension, preeclampsia, septicemia, maternal death, and pyelonephritis. We recommend routine urine culture screening for all pregnant women attending prenatal clinics in order to the harmful effects of undiagnosed asymptomatic bacteriuria on mother and child. This is done to protect mother and child from any complications that may emerge due to infection. Microscopy and microbiological culture can be used to diagnose asymptomatic bacteriuria. The most effective screening method for asymptomatic bacteriuria during pregnancy is therefore urine culture. The most prevalent isolates were gram-negative organisms, with Escherichia coli serving as the main urinary pathogen. Imipenem, Pipercillin-Tazobactam, Amikacin, Nitrofurantoin, Eftazidime, Cefotaxime, and Co-trimoxazole were the antibiotics that were most effective against the isolates. Ampicillin was discovered to be the least sensitive antibiotic in all of the isolates. Large-scale ESBL production by *Escherichia coli* and *Klebsiella pneumoniae* limits the range of available treatments. For the treatment of UTI in patients with ESBL-producing isolates, Imipenem continues to be the medicine of preference. Amikacin and Nitrofurantoin have been identified as less expensive alternatives.

ACKNOWLEDGEMENTS

Authors would like to thank all the Doctors and Nursing Staff who directly or indirectly helped them for the research.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Rubin RH, Shapiro ED, Andriole VT, Davis RJ, Stamm WE. Evaluation of new anti-infective drugs for the treatment of urinary tract infection. Clin Infect Dis. 1992;15(suppl 1):S216-27.
2. Delzell JE Jr., Lefevre ML. Urinary tract infections during pregnancy. American Family Physician. 2000;61(3):713-21.
3. The National Collaborating Centre for Women's and Children's Health. Clinical guidelines. In: Antenatal care: routine care for the healthy pregnant women. London: RCOG Press; 2003:79-81.
4. Detailed diagnosis procedures for patients discharged from short-stay hospitals. National Centre for Health Statistics. 1985:87-1751.
5. Campbell-Brown M, McFadyen IR, Seal DV, Stephenson ML. Is screening for bacteriuria in pregnancy worthwhile? BMJ (Clin Res Ed). 1987;294 (6587):1579-82.
6. Romero R, Oyarzun E, Mazor M, Sirtori M, Hobbins JC, Bracken M. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. Obstet Gynecol 1989;73:576-82.
7. Bachman JW, Heise RH, Naessens JM, Timmerman MG. A study of various tests to detect asymptomatic urinary tract infections in an obstetric population. JAMA. 1993;270:1971-4.
8. 8Enayat K, Fariba F, Bahram N. Asymptomatic bacteriuria among pregnant women referred to outpatient clinics in Sanandaj, Iran. Int Braz J Urol. 2008;34(6):699-707.
9. Raz R. Asymptomatic bacteriuria. Clinical significance and management. Int J Antimicrob Agents. 2003;22:45-7.
10. Akinloye O, Ogbolu DO, Akinloye OM, Terry Alli OA. Asymptomatic bacteriuria of pregnancy in Ibadan, Nigeria: a re-assessment. Br J Biomed Sci. 2006;63:109-12.
11. Fatima N, Ishrat S. Frequency and risk factors of asymptomatic bacteriuria during pregnancy. J Coll Physicians Surg Pak. 2006;16:273-5.
12. Stenqvist K, Dahlen-Nilsson I, Lidin-Janson G. Bacteriuria in pregnancy. Frequency and risk of acquisition. Am J Epidemiol. 1989;129:372-9.
13. Saeed S, Tariq P. Symptomatic and Asymptomatic Urinary Tract Infections during pregnancy. Intl J Microbiol Res. 2011;2(2):101-4.
14. McIsaac W, Carroll JC, Biringer A, et al. Screening for asymptomatic bacteriuria in pregnancy. J Obstet Gynaecol Can. 2005;27:20-4.
15. Imade PE, Izekor PE, Eghafona NO, Enabulele OI, Ophori E. Asymptomatic bacteriuria among pregnant women. North Am J Med Sci. 2010;2(6):263-6.

16. Abdullah AA, Al-Moslih MI. Prevalence of asymptomatic bacteriuria in pregnant women in Sharjah, United Arab Emirates. Eastern Mediterranean Health Journal. 2005;11(5):1045-52.

Cite this article as: Meshram PS, Kubde AR, Kothalkar VS, Giri AB. Asymptomatic bacteriuria in pregnancy screening, risk factors, diagnosis and treatment. Int J Res Med Sci 2023;11:2616-20.