

An observational study to determine the prevalence and risk factors of asymptomatic bacteriuria and its antibacterial susceptibility among pregnant women in the department of obstetrics and gynaecology in S.M.S. Medical College, Jaipur

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Abstract

Introduction: Urinary Tract Infections (UTIs) are commonly observed in pregnancy because of the physiological and structural alterations in the genitourinary system. These infections may appear with symptoms or remain silent. Asymptomatic Bacteriuria (ASB) refers to the presence of actively multiplying bacteria in quantities greater than 10⁵/ml in urine from the urinary tract, excluding the distal urethra, without any clinical features of UTI

Aim: To determine the prevalence and risk factors (gestational diabetes mellitus, low socioeconomic status, high parity) of asymptomatic bacteriuria and its antibacterial susceptibility in pregnant women attending the Antenatal clinic for their first visit in SMS medical collage Jaipur.

Conclusion: This study highlights the need to screen pregnant women for asymptomatic bacteriuria, as several risk factors were found. Although factors like age, occupation, religion, education, BMI, pregnancy stage, and personal habits showed some differences, bacteriuria was significantly more common in women living in rural areas, those with low socio-economic status, those who had multiple pregnancies, and those with gestational diabetes

Keywords: Asymptomatic bacteriuria, pregnancy, antibacterial susceptibility

Introduction

Urinary Tract Infections (UTIs) are commonly observed in pregnancy because of the physiological and structural alterations in the genitourinary system. These infections may appear with symptoms or remain silent. Asymptomatic Bacteriuria (ASB) refers to the presence of actively multiplying bacteria in quantities greater than 10⁵/ml in urine from the urinary tract, excluding the distal urethra, without any clinical features of UTI [1].

ASB is rare in infants and young children [2], but its prevalence increases in women compared to men, particularly with advancing age. A large proportion of individuals with ASB do not develop symptomatic infections and may remain unaffected clinically. Although UTIs can occur in both sexes and at any age, pregnant women are more susceptible due to anatomical features such as a shorter urethra and the possibility of contamination from intestinal flora. During pregnancy, the urinary tract undergoes functional and anatomical modifications, coupled with immune adaptations, which predispose women to ASB [3]. Evidence suggests that approximately 70% of UTI cases among pregnant women are attributed to ASB. Untreated ASB may progress to symptomatic infection, heightening the risk of pyelonephritis, preterm birth, intrauterine growth restriction, low birth weight, and increased perinatal mortality [4]. The condition is most often diagnosed during early gestation, while detection rates decline in later trimesters.

Aim & Objectives Aim

To determine the prevalence and risk factors (gestational diabetes mellitus, low socioeconomic status, high parity) of asymptomatic bacteriuria and its antibacterial susceptibility in pregnant women attending the Antenatal clinic for their first visit in SMS medical collage Jaipur.

Objective To determine the prevalence of asymptomatic bacteriuria in pregnant women attending antenatal clinic in Department of Obstetrics and Gynecology of SMS Medical College, Jaipur.

To identify the most common microorganism causing asymptomatic bacteriuria and its antibacterial susceptibility. To find out the risk factors of asymptomatic bacteriuria.

Material & Methods

Inclusion Criteria

- All pregnant women who attended the antenatal clinic.
- Women who were willing to participate in the study and provided written, informed consent.
- Women who were not participating in any other study.

Exclusion Criteria

- Women with symptomatic urinary tract infection or pyrexia.
- Pregnant women who had taken antibacterial medication in the preceding two weeks.
- Pregnant women with known congenital renal anomalies or pre-existing renal disease.

Sample Size

The sample size was calculated to be 223 pregnant women based on a previous study by Talukdar B, Kalita D, Deka S, and Mahela S (The New Indian Journal of OBGYN, 2023; 9 (2): 216–220), which reported a 10% prevalence of asymptomatic bacteriuria in pregnancy. The most common microorganism identified was *E. coli* (52.17%). The calculation was performed with 80% power, a 0.05 level of significance (α error), and a 4% absolute error.

Observations And Results

Table No- 1 Distribution of patients according to Age.

Age Distribution (in years)	Total		Non-Significant Bacteriuria		Significant Bacteriuria	
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage
20-25	107	47.98	88	82.24	19	17.76
26-30	85	38.12	68	80.00	17	20.00
31-35	23	10.31	17	73.91	6	26.09
36-40	8	3.59	6	75.00	2	25.00
Total	223	100.00	179	80.27	44	19.73
Mean±SD	26.41±3.99		26.79±4.33		26.31±3.91	
P-Value	0.5					

The study included 223 patients aged between 20 and 40 years, with the majority falling in the 20–25 years age group (107; 47.98%), followed by 85 (38.12%) in the 26–30 years group, 23 (10.31%) in the 31–35 years group, and 8 (3.59%) in the 36–40 years group. Among them, 179 patients (80.27%) had non-significant bacteriuria, while 44 patients (19.73%) had significant bacteriuria. The distribution of non-significant bacteriuria was highest in the 20–25 years group (88; 82.24%), followed by 68 (80.00%) in 26–30 years, 17 (73.91%) in 31–35 years, and 6 (75.00%) in 36–40 years. Significant bacteriuria was observed in 19 patients

(17.76%) aged 20–25 years, 17 (20.00%) aged 26–30 years, 6 (26.09%) aged 31– 35 years, and 2 (25.00%) aged 36–40 years. Although most cases were seen in younger patients, the proportion of significant bacteriuria showed a slight increasing trend with age. The mean age of the study population was 26.41 ± 3.99 years, with the mean age in the non-significant bacteriuria group being 26.79 ± 374.33 years and in the significant bacteriuria group 26.31 ± 3.91 years; however, the difference was not statistically significant (P = 0.5).

Table No- 3 Distribution of patients according to Religion.

Religion	Total		Non-Significant Bacteriuria		Significant Bacteriuria		P- Value
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	
Hindu	91	40.81	70	76.92	21	23.08	0.29
Muslim	132	59.19	109	82.58	23	17.42	
Total	223	100.00	179	80.27	44	19.73	

In this study of 223 patients, 132 (59.19%) were Muslims and 91 (40.81%) were Hindus. Among the Muslim patients, 109 (82.58%) had non-significant bacteriuria and 23 (17.42%) had significant bacteriuria. In the Hindu group, 70

(76.92%) had non-significant bacteriuria while 21 (23.08%) had significant bacteriuria. Although a higher proportion of significant bacteriuria was observed among Hindus compared to Muslims, the difference was not statistically significant (P = 0.29).

Table No- 12 Distribution of patients according to Urine Culture.

Urine Culture	No. of Patients	Percentage
Sterile	179	80.27
E. Coli	20	8.97
Staphylococcus aureus	10	4.48
Enterococcus faecalis	6	2.69
Klebsiella pneumoniae	8	3.59
Total	223	100.00

Out of the 223 urine cultures performed, 179 samples (80.27%) were sterile. Among the positive cultures, *Escherichia coli* was the most common isolate, found in 20 patients (8.97%). Other organisms included *Staphylococcus aureus* in 10 patients (4.48%), *Klebsiella pneumoniae* in 8 patients (3.59%), and *Enterococcus faecalis* in 6 patients (2.69%).

Discussion

Asymptomatic bacteriuria (ASB) is a common condition during pregnancy and, if left undetected, can lead to adverse maternal and fetal outcomes such as pyelonephritis, preterm labor, and low birth weight. This study aimed to assess the prevalence, associated risk factors, and antibacterial susceptibility patterns among pregnant women. The findings suggest that while a significant proportion of women harbored bacteria in their urine without symptoms, certain groups were more vulnerable. Multiparity, rural residence, lower socio-economic status, and the presence of gestational diabetes mellitus were significantly associated with a higher risk of ASB. Although variations were observed with age, BMI, education, and occupation, these factors were not statistically conclusive.

The bacteriological profile was dominated by *Escherichia coli*, consistent with global trends, followed by *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Enterococcus faecalis*. Antibiotic sensitivity patterns varied, emphasizing the necessity of culture-specific therapy. These insights highlight the need for routine screening and personalized treatment during antenatal care to prevent complications. Early detection and management of ASB can reduce the risk of upper urinary tract infections and improve pregnancy outcomes.

Conclusion

This study highlights the need to screen pregnant women for asymptomatic bacteriuria, as several risk factors were found. Although factors like age, occupation, religion, education, BMI, pregnancy stage, and personal habits showed some differences, bacteriuria was significantly more common in women living in rural areas, those with low socio-economic status, those who had multiple pregnancies, and those with gestational diabetes. Notably, multiparous women and those with gestational diabetes had a markedly higher burden of infection, suggesting these groups require closer monitoring. Although most urine samples were sterile, *E. coli* was the predominant pathogen among culture-positive cases, followed by *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Enterococcus faecalis*. Antibiotic sensitivity patterns varied across organisms, with some showing high susceptibility to specific antibiotics, highlighting the importance of targeted therapy. Overall, the findings emphasize the need for regular antenatal screening and timely, culture-based treatment to reduce the risk of complications and improve maternal and neonatal outcomes.

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