

Asymptomatic Bacteriuria among Pregnant Women Attending Antenatal Care in Sudan

Sara Mohammed Ali^{1,2*}, Rolla Abdalkader Ahmed Nasser², Naima Jama Adam³, Athar Saed Jama³, Salma Elnour Rahma Mohamed¹, Hassan Hijazi¹, Sahar Mohammed Seed Ahmed²

¹College of Health Sciences, Medical Laboratory Sciences Program, Gulf Medical University, Ajman, United Arab Emirates

²Faculty of Medical Laboratory Sciences, Department of Microbiology, Omdurman Ahlia University, Omdurman, Sudan

³Faculty of Medical Laboratory Sciences, Department of Microbiology, International University of Africa, Khartoum, Sudan

Abstract

Background: Asymptomatic bacteriuria is common during pregnancy due to the apparent reduction in immunity of pregnant women, which appears to encourage the growth of both commensal and non-commensal microorganisms. The objective of this study was to determine the frequency of asymptomatic bacteriuria and identify the causative organisms among pregnant women.

Methods and Results: This cross-sectional study was carried out at Ibrahim Malik Teaching Hospital and Bashaier University Hospital from April to July 2019 to assess the prevalence of asymptomatic bacteriuria among pregnant women. Fifty urine specimens were collected from pregnant women who didn't show any signs or symptoms of urinary tract infection. Clean-catch mid-stream urine was collected into a sterile, universal container. Bacteriological culture and bacterial identification were carried out. The prevalence of asymptomatic bacteriuria in pregnant women in this study was 12%. *Escherichia coli* and *Staphylococcus aureus* were the most frequently isolated organisms: 2/6(33.3%) and 2/6(33.3%), respectively, followed by *Proteus species* 1/6(16.7%) and *Klebsiella pneumonia* 1/6(16.7%). Asymptomatic bacteriuria tended to increase from the first to the third trimester (1/8.3%, 2/11.1%, and 3/15%, respectively), but without statistical significance ($P=0.845$). We also found a trend to increase in the prevalence of asymptomatic bacteriuria with decreasing age: 2(15.4%) in the age group of 18-25 years, 3(11.5%) in the age group of 26-33 years, and only 1(9.1%) in the age group of 34-41 years ($P=0.890$).

Conclusion: Periodic urine cultures should be performed routinely throughout pregnancy, especially during the first and third trimesters, to identify any unsuspecting unsuspected infection. Bacterial counts are of the most importance and should be done routinely. This measure will significantly reduce maternal and obstetric complications associated with pregnancy. (International Journal of Biomedicine. 2023;13(3):172-174.)

Keywords: asymptomatic bacteriuria • pregnancy • urine cultures

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Introduction

Asymptomatic bacteriuria is defined by a mid-stream sample of urine showing bacterial growth $>10^5$ CFU/mL in two consecutive samples in women without urinary tract infection (UTI) symptoms.^(1,2) Asymptomatic bacteriuria is common

during pregnancy due to the apparent reduction in immunity of pregnant women, which appears to encourage the growth of both commensal and non-commensal microorganisms.⁽³⁾ UTI causes symptoms such as frequent urination, painful urination, or pelvic pain. Asymptomatic bacteriuria does not cause any noticeable symptoms.⁽⁴⁾ Bacteria cause UTIs typically when

they are introduced into the urinary tract during intercourse or when wiping after a bowel movement. The bacterium *E. coli* is responsible for most cases of asymptomatic bacteriuria. Other bacterial species can also cause colonization, including *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcal species*, *Enterococci*, and group B *Streptococcus*.⁽⁵⁾

Physiological increases in plasma volume during pregnancy decrease urine concentration, and up to 70% of pregnant women develop glucosuria, which encourages bacterial growth in the urine.⁽⁶⁾ In non-pregnant women, asymptomatic bacteriuria rarely causes serious problems. However, this infection can progress upward in pregnant women, causing acute urethritis, cystitis, and pyelonephritis.⁽⁷⁾ Asymptomatic bacteriuria is associated with an increased risk of intrauterine growth retardation and low birth-weight infants.⁽⁸⁾ Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria, which could lead to pyelonephritis and adverse obstetric outcomes, such as prematurity, low birth weight, and preterm labor. Preterm labor is a common cause of serious complications, including death, in newborn babies.⁽⁹⁾ According to the WHO, up to 45% of pregnant women with untreated asymptomatic bacteriuria will develop pyelonephritis. Untreated asymptomatic bacteriuria leads to the development of symptomatic cystitis in approximately 30% of patients and can lead to the development of pyelonephritis in up to 50%.

It is important to identify factors that increase infection to avoid the consequences and further complications of bacteriuria in pregnant women through early detection and treatment, as the American College of Obstetricians and Gynecologists recommends.⁽¹⁰⁾ However, a routine urine culture test is not carried out for antenatal women in many hospitals in developing countries, including Sudan, probably due to cost implication and time factor for culture results.

The objective of this study was to determine the frequency of asymptomatic bacteriuria and identify the causative organisms among pregnant women.

Materials and Methods

This cross-sectional study was carried out at Ibrahim Malik Teaching Hospital and Bashaier University Hospital from April to July 2019 to assess the prevalence of asymptomatic bacteriuria among pregnant women.

Fifty urine specimens were collected from pregnant women who didn't show any signs or symptoms of UTI. Clean-catch mid-stream urine was collected into a sterile, universal container. Wet preparation and direct Gram stain were done for all specimens. Culture on Cysteine Lactose Electrolyte Deficient agar (CLED) using a calibrated loop drop delivering 0.002ml of urine, which was incubated aerobically at 37°C overnight. Colonial morphology, indirect Gram stains, and biochemical tests, including Kligler iron agar, indole production test, urease test, citrate utilization test, methyl red test, catalase test, coagulase test, and DNase test were done.

Statistical analysis was performed using the statistical software package SPSS version 21.0 (SPSS Inc, Armonk,

NY: IBM Corp). Baseline characteristics were summarized as frequencies and percentages. Group comparisons were performed using the chi-square test. A probability value of $P < 0.05$ was considered statistically significant.

Results and Discussion

Of the 50 women, 12(24%) were in the first trimester, 18(36%) in the second, and 20(40%) in the third trimester. Asymptomatic bacteriuria tended to increase from the first to the third trimester (1/8.3%, 2/11.1%, and 3/15%, respectively), but without statistical significance ($P=0.845$).

According to age, pregnant women were distributed as follows: the age group of 18-25 (n=13), the age group of 26-33 years (n=26), and the age group of 34-41 years (n=11). We found a trend to increase in the prevalence of asymptomatic bacteriuria with decreasing age. The asymptomatic bacteriuria prevalence was as follows: 2(15.4%) in the age group of 18-25 years, 3(11.5%) in the age group of 26-33 years, and only 1(9.1%) in the age group of 34-41 years ($P=0.890$).

Wet preparation showed Pus cells >5 per high power field in 6/50(12%) cases. Colony counts yielding bacterial growth of 10^5 CFU/ml or more of pure isolates were considered significant for infection. Gram's staining reaction showed 4 Gram-negative rods and 2 Gram-positive cocci. *Escherichia coli* and *Staphylococcus aureus* were the most frequently isolated organisms: 2/6(33.3%) and 2/6(33.3%), respectively, followed by *Proteus species* 1/6(16.7%) and *Klebsiella pneumonia* 1/6(16.7%).

The prevalence of asymptomatic bacteriuria in pregnant women in this study was 12%. This is slightly lower than the 13% from the study by Ibrahim et al.⁽¹¹⁾ performed in 2018 in Kosti (Sudan). The most prevalent organism observed in our study was *Escherichia coli* 2/6(33.3%) and *Staphylococcus aureus* 2/6(33.3%). This finding agrees with a study by Sujatha and Nawan done in India.⁽⁹⁾

In this study, the differences in asymptomatic bacteriuria according to the trimesters were insignificant, which agrees with the findings reported by other researchers. In contrast, Kosti Teaching Hospital found increasing prevalence with gestational age.⁽¹¹⁾

This study showed a trend to increase asymptomatic bacteriuria prevalence with decreasing age but without statistical differences. In contrast, some studies observed a much higher prevalence of asymptomatic bacteriuria in younger pregnant women.^(12,13) Other studies found a progressive rise in bacteriuria prevalence with age.^(14,15)

Conclusion

Routine urinalysis is imprecise for the identification of pyuria and bacteriuria. Periodic urine cultures should be performed routinely throughout pregnancy, especially during the first and third trimesters, to identify any unsuspected infection. Bacterial counts are of the most importance and should be done routinely. This measure will significantly reduce maternal and obstetric complications associated with pregnancy.

Competing Interests

The authors declare that they have no competing interests.

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**Corresponding author: Sara Mohammed Ali, College of Health Sciences, Medical Laboratory Sciences Program, Gulf Medical University. Ajman, United Arab Emirates. E-mail: dr.sara@gmu.ac.ae*