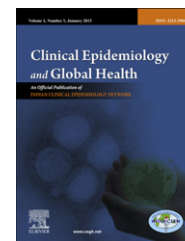


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## Student's Section

# Prevalence of asymptomatic bacteriuria and sterile pyuria in pregnant women attending antenatal clinic in a tertiary care center in Karnataka: A pilot study

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### ABSTRACT

**Background:** Asymptomatic bacteriuria (ASB) is common in pregnancy; its prevalence varies between communities and different ethnicities and countries, and has been implicated in adverse pregnancy outcomes.

**Objectives:** Primary objective to assess the prevalence of ASB and sterile pyuria pregnant women attending the antenatal clinic.

**Setting:** Antenatal Clinic of Kasturba Medical College, Manipal.

**Design:** Prospective cohort study. Included were pregnant women between 21 and 35 years, in 2nd or 3rd trimester of pregnancy after obtaining written, informed consent. Excluded were those (a) who had documented intake of antibiotics in the last 72 h (b) known HIV positive (c) had urethral catheterization at the time of presentation or in the last 7 days (d) were incontinent and (e) diagnosed diabetics. Bacteriuria was defined as urine culture showing  $\geq 10^5$  colonies and sterile pyuria was defined as  $\geq 10$  white blood cells/pus cells or/and  $\geq 5$  red blood cells/per high power field on microscopic examination of centrifuged urine sample.

**Results:** Out of a sample 59 patients, 5 (8.74%; 95% CI 3.27–18.75) had ASB with Gram-negative bacteria, 40% resistant to amoxicillin and co-trimoxazole and all sensitive to aminoglycosides. Sterile pyuria was found in 17 (28.81%; 95% CI: 18.77–41.45).

**Conclusions:** About one-tenth of pregnant women have ASB in KMC, Manipal. And therefore routine urine cultures must be done during pregnancy to detect and treat it. However since almost 28% women also have sterile pyuria further research is needed to find out the cause for this using newer molecular diagnostic technique.

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## 1. Introduction

Urinary tract infections (UTIs) are common in women, especially during pregnancy, because of hormonal and mechanical factors, which increase risk for urinary stasis and ureterovesical reflux. Progesterone levels rise during pregnancy, which causes relaxation of smooth muscles of the whole urinary tract resulting in dilatation of the pelvis, and ureter and vesico-ureteral reflux, stasis of urine and predispose to infection risk of UTIs in pregnant women. This risk is aggravated by a short urethra and difficulty with hygiene as a result of a distended, pregnant belly.<sup>1</sup>

The term ASB is defined as significant bacterial colonization of the lower urinary tract without symptoms (I). Traditional diagnostic criteria of significant bacteriuria include culture of  $10^5$  colony forming units (CFUs)/ml of a single uropathogen on two consecutive clean catch urine specimens.<sup>2</sup> Sterile pyuria was defined as  $\geq 10$  white blood cells/pus cells or/and  $\geq 5$  red blood cells/per high power field on microscopic examination of centrifuged urine sample and the urine culture was sterile for commonly isolated organisms.<sup>3</sup>

Bacteriuria often develops in the first few months of pregnancy and is frequently associated with a reduction in concentrating ability, suggesting involvement of the kidney. The smooth muscle relaxation and subsequent ureteral dilatation that accompany pregnancy are thought to facilitate the ascent of bacteria from the bladder to the kidney. As a result, bacteriuria during pregnancy has a greater propensity to progress to pyelonephritis (up to 40%) than in non-pregnant women.<sup>1</sup>

Bacteriuria has been associated with an increased risk of preterm birth, low birth weight, and perinatal mortality.<sup>2,4</sup> Studies have also shown that treatment of bacteriuria during pregnancy reduces the incidence of these complications and lowers the long-term risk of sequelae following ASB.<sup>2,4</sup>

A study conducted in the US<sup>5</sup> reported 43% and a study conducted in Aligarh, India reported about 39%<sup>6</sup> of ASB in pregnant women. The most common organism associated with bacteriuria in pregnancy is *Escherichia coli* and among the gram-positive cocci, coagulase negative species of Staphylococci.<sup>5,6</sup> High resistance was reported by the gram-negative bacilli as well as gram-positive cocci to the  $\beta$ -lactam group of antimicrobials, fluoroquinolones and aminoglycosides in India in women with bacteriuria.<sup>2,6</sup> However, there is dearth of literature on the prevalence of ASB, especially from Southern India. Since antimicrobial resistance (AMR) patterns vary from community to community, there is a need for continuous surveillance and generation of community specific data. Hence there is a need to assess the prevalence of ASB in south Indian setup.

## 2. Methodology

### 2.1. Objectives

Primary objective was to assess the prevalence of ASB in pregnant women attending the antenatal clinic.

The secondary objectives were (a) to assess the prevalence of symptomatic bacteriuria and sterile pyuria in pregnant women attending the antenatal clinic, (b) to assess the common bacterial isolates in urine samples of pregnant women with asymptomatic and symptomatic bacteriuria, and (c) to assess the antimicrobial resistance in common bacterial isolates in urine samples of pregnant women with asymptomatic and symptomatic bacteriuria.

### 2.2. Setting

This study was conducted in the Antenatal Clinic, Department of Obstetrics and Gynecology as well as Department of Microbiology, Kasturba Medical College (KMC), Manipal. It was conducted after obtaining institutional ethical clearance. Thereafter, informed written consent was taken from the participants prior to recruitment.

### 2.3. Design

Prospective cross-sectional survey.

### 2.4. Participants

This study was conducted in immune-competent pregnant women, aged 21–35 years of age, in the 2nd or 3rd trimester of pregnancy coming for antenatal care in the department of Obstetrics and Gynecology. Excluded were those (a) who had documented intake of antibiotics in the last 72 h (b) were known HIV positive (c) had urethral catheterization at the time of presentation or in the last 7 days (d) were incontinent and (e) diagnosed diabetics.

### 2.5. Sample size

Initially we had assumed a conservative estimate of ASB of 50%, since it has been reported to be 43% from the US.<sup>5</sup> Using the formula:  $(1.96)^2 pq/d^2$ , where  $p = 0.5$ ,  $q = 0.5$  and  $d$ , the margin of error is 0.1, 96 patients were to be recruited. However, sample size was recalculated after we had recruited 50 cases. We found a prevalence of bacteriuria in approximately 10% of pregnant women. To detect this with a margin of error of 8%, with a confidence level of 95% and a population size of 20,000, we required a minimum sample size of 54 using online sample size calculator.<sup>7</sup> Therefore, we recruited 59 subjects.

### 2.6. Sampling technique

Consecutive pregnant women who fulfilled inclusion criteria and had no exclusion were invited to participate. Clinical data was abstracted from hospital records on preformed questionnaire. They were asked to collect midstream urine sample in sterile culture vial with all aseptic precautions. The urine was sent for culture to the Department of Microbiology.

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