



## Original Research Article

## Bacteriological profile of asymptomatic bacteriuria among pregnant women attending tertiary care hospital



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## ARTICLE INFO

## Article history:

Received 11-05-2019

Accepted 10-07-2019

Available online 09-09-2019

## Keywords:

Asymptomatic bacteriuria (ASB)

Pregnant women

antenatal

Significant bacteriuria

Urinary tract infections (UTIs)

## ABSTRACT

**Introduction:** Urinary tract infections (UTIs) are common in pregnancy. It is classified as Symptomatic bacteriuria & Asymptomatic bacteriuria (ASB) based on clinical presentation. Failure to detect ASB causes increased risk for Mother and fetus.

**Aim and Objectives:** To study the prevalence, pathogens associated and antibiotic sensitivity pattern for the isolated pathogens causing significant bacteriuria among pregnant women without symptoms of urinary tract infection.

**Results:** Out of 240 urine samples, 12(5%) showed significant bacteriuria. Prevalence of culture positivity with respect to age was maximum between the age group of 25-30 (58.33%). Prevalence of culture positivity among the trimesters, was high in the second trimester of pregnancy (75%). Among the bacteria isolated, *Escherichia coli* was the most (41.67%) followed by *klebsiella pneumonia* (25%) and *CoNS* (16.67%). Most of the isolates showed resistance to Cephalexin.

**Materials and Methods:** This prospective study will be conducted in a Tertiary Care Hospital for a period of 1 year with 240 Urine samples of pregnant women.

**Conclusion:** In this study, we would like to emphasize the importance of including urine culture as a routine antenatal screening test to avoid serious maternal and fetal complications.

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### 1. Introduction

Urinary tract infections (UTIs) in pregnancy is classified as Symptomatic bacteriuria & Asymptomatic bacteriuria (ASB) based on clinical presentation. Asymptomatic bacteriuria (ASB) is a condition in which presence of minimum  $10^5$  Colony forming units (CFU) per ml of clean catch midstream urine without symptoms and signs such as dysuria, frequency of micturition, fever, loin pains, renal angle tenderness, suprapubic pain and tenderness.<sup>1,2</sup> The most common aetiological agent associated with both Symptomatic bacteriuria & Asymptomatic bacteriuria is *Escherichia coli*<sup>3</sup> which accounts for 70-80% of the isolates. In Pregnancy various physiological and anatomical changes leads to significant alterations in the Urinary tract. These

changes have a profound impact on the acquisition of bacteriuria.<sup>4</sup> The risk of UTI may begin in 6<sup>th</sup> week and will be at peak during 22-24<sup>th</sup> weeks of pregnancy. ASB accounts for 2-11% in Pregnant women.<sup>5</sup> Among them 20-50% can develop acute Pyelonephritis<sup>6,7</sup> and it can lead to adverse obstetric outcomes as well, such as anaemia, hypertensive disease, prematurity, and higher foetal mortality rates if left untreated. Screening for asymptomatic bacteriuria has become a part of standard obstetric care these days and urine culturing is the Gold Standard screening technique for detecting the ASB which occurs during pregnancy. Failure to detect ASB causes increased risk for Mother and fetus.

Maternal complications include Pyeonephritis, Preeclampsia, endometritis, premature rupture of amniotic membrane, preterm labour and septicemia<sup>8</sup> Fetal complications includes abortion, low birth weight(LBW),

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Intra uterine growth retardation (IUGR) and even foetal death.<sup>7,9–13</sup> To ensure proper therapy, adequate knowledge of microorganisms that causes UTI and their Anti microbial susceptibility testing is required.

## 2. Aim and Objectives

1. To study the prevalence, pathogens associated and distribution of ASB with respect to age among antenatal mothers.
2. To determine the antibiotic sensitivity pattern for the isolated pathogens.
3. To emphasis the importance of early detection and to give guidance for the treatment and prevention of bacteruria in pregnant patients thereby aiding in the prevention of further complications.

## 3. Materials and Methods

This study will be conducted in Department of Microbiology and Obstetrics in a Tertiary Care Hospital. Ethical committee clearance was obtained from the Institution and informed written consent was obtained from the antenatal mothers before collecting the specimen.

### 3.1. Duration of study

1 year (June 2017 to May 2018)

### 3.2. Study design

This is a prospective study.

### 3.3. Study population

Antenatal mothers.

### 3.4. Sample size

240 Urine samples.

### 3.5. Inclusion criteria

Antenatal women of all trimesters without any symptoms of UTI.

### 3.6. Exclusion criteria

1. Antenatal women with symptoms of UTI.
2. Antenatal women on antibiotics.

### 3.7. Sample collection

Before collecting urine sample the patients will be instructed to wash their hands and clean their genital area with soap and water and dry the area with sterile gauze pad.

Patients will then be asked to collect 10-20ml of Clean Catch Midstream Urine (CCMSU) in a sterile container

and transport it immediately to the microbiological laboratory<sup>14,15</sup>

### 3.8. Processing of sample

All the collected urine samples will be microscopically examined for the presence of bacteria, RBC and pus cells by Gram stain and wet mount. Then they will be inoculated on to Cysteine Lactose Electrolyte Deficient agar and Blood agar plates and the plates will be incubated at 37 degree C for 18 to 24hrs. Subsequently semi quantitative analysis will be done. A colony count of  $10^5$  or more pure isolates will be processed for further identification. The isolates will be identified by standard biochemical tests.<sup>15</sup>

**Table 1:** Urine culture results (n=240)

| Culture                 | No.of samples | Percentage |
|-------------------------|---------------|------------|
| Significant bacteriuria | 12            | 5%         |
| Contamination           | 5             | 2.1%       |
| Sterile                 | 223           | 92.9%      |

**Table 2:** Prevalence of Culture positive samples according to age (n=12)

| AGE(years) | Culture positive samples | Percentage |
|------------|--------------------------|------------|
| 20-25      | 4                        | 33.33%     |
| 25-30      | 7                        | 58.33%     |
| 30-35      | 1                        | 8.33%      |

**Table 3:** Prevalence of culture positive samples according to trimesters of pregnancy (n=12)

| Trimester | Culture Positive Samples | Percentage |
|-----------|--------------------------|------------|
| First     | 2                        | 16.67%     |
| Second    | 9                        | 75%        |
| Third     | 1                        | 8.33%      |

**Table 4:** Bacterial isolates Detected (n=12)

| Isolates                                | Culture positive Samples | Percentage |
|---|--------------------------|------------|
| Escherichia coli                        | 5                        | 41.67%     |
| Klebsiella pneumoniae                   | 3                        | 25%        |
| Enterobacter aerogens                   | 1                        | 8.33%      |
| Staphylococcus aureus                   | 1                        | 8.33%      |
| CoNS(Coagulase negative staphylococcus) | 2                        | 16.67%     |

## 4. Antibiotic sensitivity test

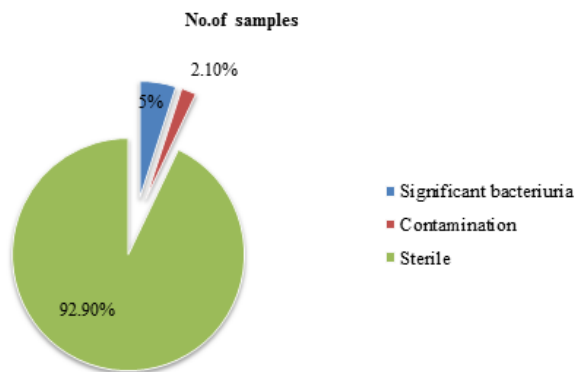
The isolates are further tested for antibiotic sensitivity. Antimicrobial sensitivity testing (AST) will be carried out by using modified Kirby Bauer disc diffusion method.

The results will be interpreted in accordance with clinical laboratory standards institute's guidelines (CLSI- 2017).<sup>16</sup>

**Table 5:** Antimicrobial sensitivity pattern of the Isolates

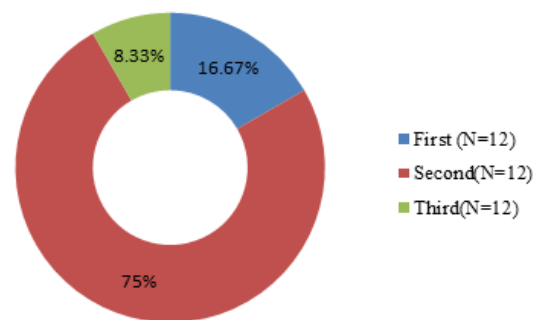
| Bacterial isolates          | Amoxicillin (10ug) |     | Amoxy-Clav |     | Cephalexin (30ug) |     | Ceftriaxone |     | Nitrofurantoin |     |
|-----------------------------|--------------------|-----|------------|-----|-------------------|-----|-------------|-----|----------------|-----|
|                             | S                  | %   | S          | %   | S                 | %   | S           | %   | S              | %   |
| Escherichia coli (n=5)      | 3                  | 60  | 5          | 100 | 2                 | 40  | 4           | 80  | 4              | 80  |
| Klebsiella pneumonia (n=3)  | IR                 | -   | 2          | 66  | 1                 | 33  | 3           | 100 | 3              | 100 |
| Enterobacter aerogens (n=1) | IR                 | -   | IR         | -   | IR                | -   | 1           | 100 | 1              | 100 |
| Staphylococcus aureus (n=1) | 1                  | 100 | 1          | 100 | 1                 | 100 | 1           | 100 | 1              | 100 |
| CoNS (n=2)                  | 1                  | 50  | 1          | 50  | 1                 | 50  | 1           | 50  | 2              | 100 |

IR- intrinsically resistant



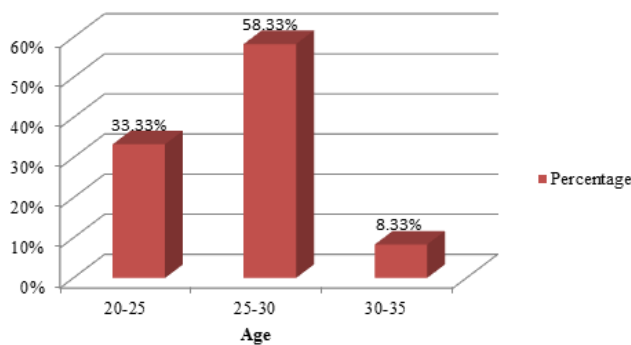
**Fig. 1:** Urine culture results(n=240)

**Prevalence of culture positive samples according to trimesters**



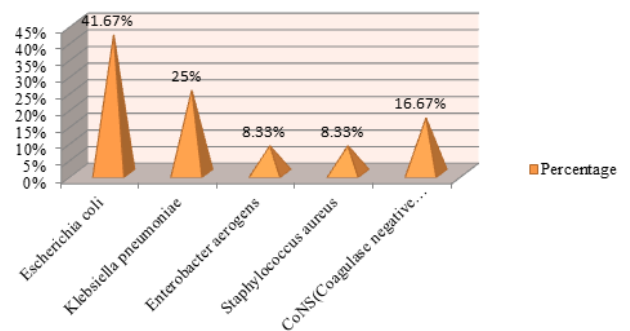
**Fig. 3:** Prevalence of culture positive samples according to trimesters of pregnancy (n=12)

**Prevalence of Culture positive samples according to age**



**Fig. 2:** Prevalence of Culture positive samples according to age (n=12)

**Bacterial isolates Detected**



**Fig. 4:** Bacterial isolates detected (n=12)

**5. Results**

Out of 240 urine samples, 12(5%) showed significant bacteriuria. Prevalence of culture positivity with respect to age was maximum between the age group of 25-30 (58.33%). Prevalence of culture positivity among the trimesters of pregnancy was high in the second trimester (75%). Among the bacteria isolated, Escherichia coli was the most (41.67%) followed by klebsiella pneumonia (25%)

and CoNS (16.67%). Most of the isolates showed resistance to cephalixin.

**6. Discussion**

The prevalence of Asymptomatic bacteriuria (ASB) in this study was found to be 5%, this correlates with some other studies, which have shown the prevalence between 5 and 12%.<sup>17-20</sup> Various reports across the world have

documented a prevalence of as high as 40 to 45%<sup>6,10</sup> In this study higher incidence of ASB was reported in 2<sup>nd</sup> trimester. This correlates with studies done by.<sup>21</sup> The common pathogen isolated was *Escherichia coli* followed by *Klebsiella* species. This correlates with other studies done by.<sup>10,19,22–27</sup> The most preferred antibiotics for ASB are Amoxicillin, Cephalexin, Amoxy-clav, Ceftriaxone and nitrofurantoin. But it is advised that nitrofurantoin should not be given after 36 weeks of pregnancy. Antimicrobial susceptibility testing showed, Cephalexin was resistance in most of the isolates and 100% sensitivity towards Nitrofurantoin was seen in most of the isolates. Among the CoNS, one of the isolate was Methicillin Resistant but showed sensitivity to Nitrofurantoin. All the antibiotics should be given for seven days to ensure complete cure.<sup>28</sup> Urine culture should be repeated after completion of treatment to ensure complete eradication of pathogen.<sup>29–31</sup>

## 7. Conclusion

In this study, we would like to emphasize the importance of including urine culture as a routine antenatal screening test to avoid serious maternal and fetal complications.

## 8. Source of Funding

None.

## 9. Conflict of Interest

None.

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**Cite this article:** Arumugam V, Srinivasagam M, Rajkannan S. Bacteriological profile of asymptomatic bacteriuria among pregnant women attending tertiary care hospital. *Indian J Microbiol Res* 2019;6(3):229-232.