

# PREVALENCE OF ASYMPTOMATIC BACTERIURIA IN PREGNANT WOMEN

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## ABSTRACT

**Objective:** To study the prevalence of asymptomatic bacteriuria (ASB) in pregnant women of local population in Karachi.

**Design:** Prospective, hospital based conducted during September 2001-March 2002.

**Setting:** Basic Medical Sciences Institute, Jinnah Postgraduate Medical Center Karachi.

**Subjects and Methods:** Group A (study group) consisted of 290 pregnant women attending the OPD of Gynaecology and Obstetrics units for antenatal check up and Group B (control) consisted of 70 nonpregnant women of fertile age. Midstream urine was collected and aerobically incubated at 37°C on CLED agar. Growth of  $>1 \times 10^5$  CFU/mL was taken as significant bacteriuria. Gram-negative bacteria were identified by API 20-E and gram-positive by standard routine methods.

**Results:** The two groups were age matched (P value  $>0.05$ ). Prevalence of asymptomatic bacteriuria was 6.2% (18/290) in the study group and 2.85% (2/70) in control group. E. coli was the common uropathogen in both groups and Staph. saprophyticus the second common only in-group A. Prevalence of ASB remained statistically the same in pregnant and nonpregnant women (P value  $>0.05$ ) by  $\chi^2$  application.

**Conclusion:** Prevalence of ASB before pregnancy continues during pregnancy, if not treated. Uropathogens remain the same. All pregnant women should be screened for ASB by culture.

**KEY WORDS:** Asymptomatic bacteriuria, Pregnant women, Urine culture.

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## INTRODUCTION

Urine in bladder is normally sterile.<sup>1</sup> The presence of bacteria in urine is called bacteriuria.<sup>2</sup> Asymptomatic bacteriuria (ASB) is bacteriuria<sup>3</sup> without apparent symptoms of urinary tract infections (UTIs). The importance of ASB lies in the insight it provides into symptomatic infections.<sup>4</sup>

Asymptomatic bacteriuria may exist for short term in non-pregnant women but rarely resolves spontaneously during pregnancy.<sup>5</sup> The prevalence of ASB does not change during pregnancy but there is change in pathogenesis, which keeps mother and baby at risk of complications due to bacteriuria.<sup>6</sup> Symptomatic UTIs mostly occur later in pregnancy.<sup>7</sup> ASB during pregnancy is an established risk for symptomatic UTI, premature delivery, intrauterine growth retardation, endometritis and even fatality for mother and baby.<sup>6,8,9</sup> ASB may

persist throughout pregnancy and cause complications even at the perinatal and postnatal period.<sup>9,10</sup>

Screening for ASB has little apparent value in adults with exceptions before urologic surgery and during pregnancy.<sup>11</sup> A high co-relation has been found between a negative urine culture at early pregnancy and no bacteriuric complications later in pregnancy.<sup>7,8</sup> By identification and appropriate treatment of patients at this stage of ASB, the complications in future can be prevented.<sup>12</sup> The present study was designed to screen pregnant women for ASB, to ascertain its prevalence, and to observe the spectrum of urine isolates.

## SUBJECTS AND METHODS

*Setting:* This study was conducted in the Microbiology Department, Basic Medical Sciences Institute (BMSI), Jinnah Postgraduate Medical Centre (JPMC), Karachi, during September 2001 - March 2002. JPMC is a tertiary level major hospital in public sector, located in the center of Karachi. BMSI works as referral laboratory as well as a training institute for postgraduate students. The safe Motherhood and Neonatal Care Department is the Gynecological and Obstetrics wing of JPMC. It has two units providing free health services in the respective field round the clock. BMSI is closely situated to it.

*Methods:* Group A – study group subjects were 290 pregnant women with confirmed diagnosis of pregnancy of 12-26 weeks<sup>8</sup> attending the Gynecology/Obstetrics Outpatient Department. All women were of indigent population. They were interviewed and data recorded in proforma. Only those women were registered who fulfilled the criteria of apparently normal health without any signs of UTI except frequency.

Group B – control group subjects were 70 females (married and unmarried) of fertile age 18-45 years in apparently normal health without signs and symptoms of UTI. They were either companion of pregnant women or else contacted via staff members and colleagues. Exclusion criteria were strictly observed.

### *Exclusion Criteria Women with:*

1. Known congenital anomalies of urinary tract.
2. Signs and symptoms of UTI.
3. Pyrexia.
4. History of antibiotics during the previous two weeks.
5. Catheterization during past two weeks.

*Method of Specimen Collection:* One sample of urine was collected in sterile wide mouth 100 ml capacity container with a cover.<sup>13</sup> Midstream voided urine 30-50 ml was requested.<sup>2</sup> At least 4 hours stay of urine in bladder was ensured before collection.<sup>14</sup> Instructions to women were explained for collection of the specimen. After collection and labeling the specimen, it was immediately transported and processed on the same day. In case of delay, specimen was refrigerated at 4°C.

*Processing of Specimen:* Specimen was processed in the laboratory for (i) Physical and chemical examination. (ii) Microscopy for cells. (iii) Culture was done on CLED Agar, blood agar and MacConkey agar with the help of standardized platinum (2mm) loop. Half of plate was used for specimen inoculation. Incubation was done at 37°C aerobically for 18-24 hours. Inoculation from well-mixed specimen was performed first, followed by other procedures.

### *Definitions:*

- \* Asymptomatic bacteriuria was defined as the presence of  $\geq 1 \times 10^5$  colony forming unit (CFU) per millilitre of one organism in a culture of clean voided midstream urine from a patient without fever or symptoms of UTI.<sup>6</sup>
- \* Pure growth between  $>1 \times 10^3$  and  $<1 \times 10^5$  CFU/ml was taken as doubtful significance and culture was repeated. Pure growth  $<1 \times 10^3$  CFU/ml was taken as growth of no significance.
- \* Mixed growth of two or more organisms especially with gram positive bacilli Lactobacilli, Gardnerella vaginalis, Diphtherias, were considered to be urinary contamination.<sup>14</sup>

Identification of gram-positive organisms

Table-I: Mean Age-wise Comparison of Group A and Group B

| Group          | Mean of Ages (Years) | P value |
|----------------|----------------------|---------|
| A (n=290)      | 25.33±5.81           | >0.05   |
| B (n=70)       | 27.82±6.18           |         |
|                |                      |         |
| P-value >0.05: | Non-significant      |         |
| P-value <0.05: | Significant          |         |
| P-value <0.01: | Highly significant   |         |

was done according to standard methods.<sup>14</sup> Gram-negative organisms were confirmed by system of API-20E.

*Statistical Applications:* P values were read out from standard statistical tables with the help of t-values and degree of freedom. T-value was calculated by student "t" test formula for means  $\pm$  standard deviations of ages. Chi-square ( $\chi^2$ ) applied for t-value derivation for comparison of findings of two groups.

## RESULTS

The mean ages of pregnant women (Group A) and non-pregnant women (Group B) were 25.33±5.81 and 27.82±6.18 years respectively (Table-I), with the minimum age 18 years and maximum 44 years of group A. The two extremes of ages in group B were 19 and 42 years.

Table-II represents age-wise distribution of subjects in group A and group B. There were 199 subjects from group A in the age range of 18-25 years whereas 32 from group B, with means of ages 22±2.35 and 22.33±2.52 years respectively. In age range of 26-35 years and 36-45 years, the number of subjects with means of ages separately given. There is no statistical difference in the mean of ages of subjects in both groups (P>0.05).

Out of 290 pregnant women there were 18 samples of urine (6.20%) and only 2 cases out of 70 (2.85%) were positive for significant

Table-II: Age-wise Distribution of Pregnant Women (Group A) and Control (Group B)

| Age Group (Years) | Mean Age Group A (290) | Mean Age Group B (70) | P value |
|-------------------|------------------------|-----------------------|---------|
| 18-25             | 22.00±2.35 (199)       | 22.33±2.52 (32)       | >0.05   |
| 26-35             | 20.90±2.70 (85)        | 30.30±3.32 (33)       | >0.05   |
| 36-45             | 40.00±2.52 (06)        | 39.71±0.75 (07)       | >0.05   |

Table-III: Bacterial Growth Isolated from Urine of Pregnant Women (Group A) and Non-Pregnant Women (Group B)

| Groups | No. of Cases Tested | No. of Positive Culture | P value |
|--------|---------------------|-------------------------|---------|
| A      | 290                 | 18 (6.2%)               | >0.05   |
| B      | 70                  | 02 (2.85%)              |         |

bacteriuria in group B. The number of positive cases in pregnant women and non-pregnant women did not show any statistical difference (P>0.05). Results are shown in Table-III and in Figure-1.

Among the significant positive cases of urine samples of pregnant women, the most frequent isolate was *E. coli* (38.89%), followed by *S. saprophyticus* and *Enterobacter* spp. each 16.68% (3 out of 18 isolates), while *Staph. aureus*, *Strep. agalactiae*, *Proteus mirabilis*, *Serratia marcescens* and *C. albicans*, each were 5.55% (one out of 18 isolates). Results are given in Table-IV and Figure-2. The two positive samples of urine were bacteriuric with *E. coli* in the control group.

## DISCUSSION

The majority of infections in pregnancy are asymptomatic. Hence asymptomatic bacteriuria is also difficult to diagnose and it may persist throughout the pregnancy. The relative high prevalence of asymptomatic bacteriuria during pregnancy, its adverse consequences in women and for the pregnancy plus the ability to avoid sequelae with proper treatment justify screening pregnant women for bacteriuria.<sup>6,8</sup>

Table-IV: Spectrum of Urinary Pathogens Isolated from Urine Samples of Pregnant Women (Group A)

| Pathogen Isolated               | No. of Positive Culture | Percentage |
|---------------------------------|-------------------------|------------|
| <i>Escherichia coli</i>         | 7                       | 38.89%     |
| <i>Enterobacter</i> spp.        | 3                       | 16.68%     |
| <i>Staph. saprophyticus</i>     | 3                       | 16.68%     |
| <i>Staph. aureus</i>            | 1                       | 5.55%      |
| <i>Streptococcus agalactiae</i> | 1                       | 5.55%      |
| <i>Proteus mirabilis</i>        | 1                       | 5.55%      |
| <i>Serratia marcescens</i>      | 1                       | 5.55%      |
| <i>Candida albicans</i>         | 1                       | 5.55%      |
| Total                           | 18                      | 100.00%    |

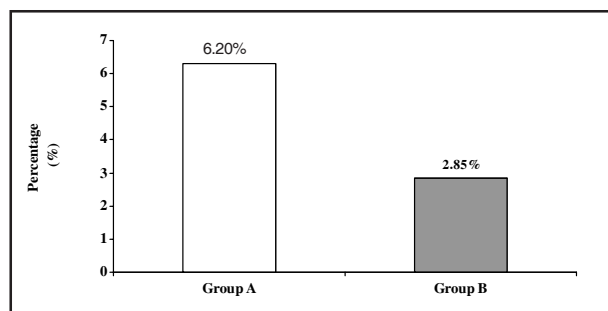


Fig-1: Bacterial Growth Isolated from Urine of Pregnant Women (Group A) & Non-Pregnant Women (Group B)

We screened pregnant as study and non-pregnant women as control for prevalence of asymptomatic bacteriuria. Both the groups were age-matched. The mean  $\pm$  Standard Deviation (S.D.) of ages in study group was  $25.33 \pm 5.81$  which coincide with the study done by Bachman,<sup>15</sup> who showed mean ages of pregnant women as  $28.2 \pm 4.5$  years.

In our study the prevalence of asymptomatic bacteriuria was found 6.2% in pregnant women. This finding is similar to 6% prevalence by Abyad (1991).<sup>16</sup> Findings of other authors were 5.6%,<sup>17</sup> 5.9%.<sup>7</sup> Our results are lower than 10%,<sup>18</sup> but higher than 2.3%.<sup>15</sup> The prevalence 2.3% was found among the well educated and well status women but we, like Little,<sup>19</sup> did not find difference in bacteriuria according to socio-economic status of subjects.

The finding of ASB in non-pregnant healthy women (18-40 years) was 5%<sup>20</sup> but in our study it was 2.85%. The prevalence of bacteriuria in females varies from less than 1% in infants to 10% and more in older women.<sup>5</sup> Our study represents no significant difference of ASB in pregnant and non-pregnant women. Our results are in agreement with Weissenbacher and Reisenberger<sup>5</sup> who described that during pregnancy the prevalence of infection does not change, but there are some variations in the pathogenesis.

In this study the etiologic agent *E. coli* (38.89%) in young women, was the most frequent uropathogen but it is different from other studies which have reported as 72%,<sup>9</sup> 80%,<sup>11</sup> and 60%.<sup>21</sup> Nathaniel<sup>22</sup> found *E. coli* to be 30% in non-pregnant fertile age, symptomatic women, of Karachi. The second most

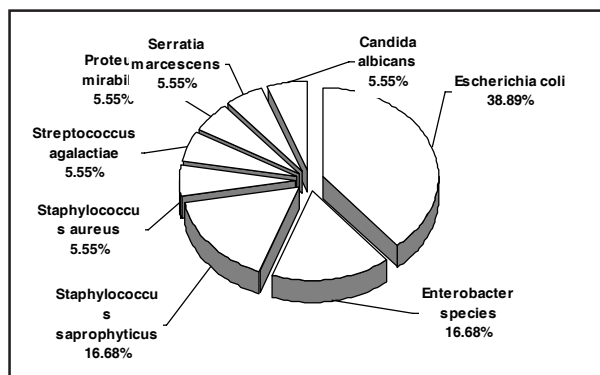


Fig-2: Spectrum of Urinary Pathogens Isolated from Urine Samples of Pregnant Women (Group A)

common urine isolate found by us was *Staph. saprophyticus* (16.68%), which is according to findings by Stamm and Hooton<sup>11</sup> as 5-15% and by Nathaniel<sup>22</sup> as 17%. Bailey<sup>23</sup> isolated 16.7% *Staph. saprophyticus* from urine of women of child-bearing age as 1<sup>st</sup> and *Staph. epidermidis* (9%) being the second most common uropathogen.

Our study findings of *Staph. saprophyticus* being the second common urine isolate are similar to the findings of Masteron et al.<sup>21</sup> who reported *K. pneumoniae* as second common urine isolate (12.28%). There was great variation in distribution and frequency of the third common pathogen of urine isolates reported.<sup>9,21</sup>

## CONCLUSIONS

Our study showed 6.20% asymptomatic significant bacteriuria in pregnant women on screening by culture. There was no statistical difference in prevalence of asymptomatic bacteriuria in pregnant and non-pregnant women. Other studies with similar prevalence of asymptomatic bacteriuria suggest that screening of pregnant women should be done by culture. Organisms recovered in order of frequency were *E. coli*, *Staph. saprophyticus* and *Enterobacter* spp.

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