

# Prevalence of Asymptomatic Bacteriuria, Associated Risk Factors and Adverse Fetomaternal Outcome among Antenatal women attending a tertiary care hospital

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## ABSTRACT

**Background:** Asymptomatic bacteriuria is the commonest bacterial infection which require medical treatment in pregnancy .Untreated bacteriuria during pregnancy is associated with adverse perinatal outcomeslike prematurity & low birth weight babies and having a 20-40% increased risk of developing pyelonephritis during pregnancy when compared with women without bacteriuria .

**Aims:** To determine the prevalence of asymptomatic bacteriuria among pregnant women attending antenatal OPD in Ganga Ram hospital,to identify risk factors that increases the risk of asymptomatic bacteriuria during pregnancy and to determine adverse maternal & perinatal outcome in the form of pyelonephritis,cystitis and low birth weight and preterm babies respectively .

**Setting:** Ante-natal clinic at Gynae Outpatient department at Sir Ganga Ram Hospital, Lahore.

**Study Design:** Cross-sectional descriptive

**Duration of Study:** 6<sup>th</sup> December, 2004 to 6<sup>th</sup> June,2005

**Sample Size:** 580 women were included in this study that fulfilled the criteria.

**Sampling Technique:** Non-probability, purposive sampling

**Methods:** Mid stream urine samples were collected from 580 asymptomatic women for asymptomatic bacteriuria over period of six months from 6<sup>th</sup> December, 2004 to 6<sup>th</sup> June, 2005 presenting at antenatal clinic of Gynae Outpatient department at Sir Ganga Ram Hospital, Lahore. All specimens were initially screened by dipstick method followed by CLED culture for those specimens which were positive for dipstick test .Primary outcome measures of the study were to determine prevalence of asymptomatic bacteriuria and adverse fetomaternal outcome in the form of preterm labor, low birth weight, cystitis and pyelonephritis respectively.

**Result:** The prevalence of asymptomatic bacteriuria in this study was 4.6 %. Multiparty ,low education level and low socio economic status were detected as risk factors having significant association with asymptomatic bacteriuria ( $p < 0.05$ ).No significant adverse perinatal outcome were detected in the form of premature delivery and low birth weight ( $p > 0.05$ ) .In group with bacteriuria 14.2%women developed cystitis as compare to non bacteriuria group in which only 2.8% developed cystitis ( $p < 0.05$ ) while none of the patient developed pyelonephritis.

**Conclusion :** Screening for bacteriuria in pregnancy and proper treatment should be considered as an essential part of antenatal care .To prevent complications of asymptomatic bacteriuria all pregnant women should be screened at their first antenatal visit .

**Keywords:** Asymptomatic bacteriuria, pregnancy, preterm labor, low birth weight.

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## INTRODUCTION

Urinary tract infection affects all age groups ,but women, particularly pregnant women are more susceptible than men due to short urethra ,easy contamination of urinary tract with fecal flora and physiological changes that occur in the urogenital tract during pregnancy<sup>1</sup>. Asymptomatic bacteriuria is a microbiological diagnosis based on the isolation of a specified quantitative count of bacteria in a properly collected specimen of urine from person without symptoms or signs of urinary tract infection<sup>2</sup>

Asymptomatic bacteriuria in pregnancy is defined as the presence of  $\geq 1,00,000$  organisms per milliliter<sup>3,4,5</sup>.Women with asymptomatic bacteriuria during pregnancy are more likely to deliver premature or have low birth weight babies, there is risk of pre-eclampsia, anemiaand 20 -40% percent increased risk of developing pyelonephritis during pregnancy.<sup>6,7</sup> Pyelonephritis in pregnancy is a serious condition and leads to preterm labor , septicemia in 10 -20% of cases and acute respiratory distress syndrome in 2% of patients<sup>2</sup>. It has been demonstrated through randomized trials that antimicrobial treatment of asymptomatic bacteriuria during pregnancy will decrease the risk of subsequent pyelonephritis from 20–35% to 1–4% and the risk of having a low birth

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weight baby from 15% to 5%.<sup>8,9</sup> Multiparity, advanced maternal age, lower education level, past urinary tract infection and lower socioeconomic status have been reported as risk factors in some of the studies, and conflicting results have been obtained from different studies.<sup>10, 11.</sup>

Very little data is available from Pakistan on the prevalence of asymptomatic bacteriuria in pregnancy. Its prevalence may be influenced by local hygienic practice and ambient factors. Moreover there are limited studies to detect pregnancy outcome in women with bacteriuria in Pakistani women. Hence this prospective study was conducted to determine the prevalence of asymptomatic bacteriuria, risk factors and their association with asymptomatic bacteriuria and adverse fetomaternal outcome in patients among a selected group of Pakistani pregnant women.

## MATERIAL AND METHOD

A descriptive cross sectional study was conducted on 580 pregnant women attending the Gynae OPD at Sir Ganga Ram hospital from 6<sup>th</sup> December, 2004 to 6<sup>th</sup> June 2005. They were recruited to the study during their first antenatal visit irrespective of their age, race and parity. Prior to sample collection, socio-demographic and clinical data about risk factors were collected by face-to-face administration of structured questionnaires. Pregnant women with a current history of UTI symptoms (e.g., dysuria, frequency and urgency, etc), diabetes mellitus/hypertension, and a history of antibiotic therapy taken within two weeks prior to the study, pyrexia of unknown origin and known congenital anomalies of the urinary tract were excluded from this study. Informed consent was obtained from all patients. General physical examination and obstetric examination were carried out. Mid stream clean catch specimen of urine was collected in sterilized bottle after washing external genitalia with clean water in pathology laboratory. All urinary samples were tested by leukocyte-nitrite-dip stick method. These sticks could detect nitrate reducing bacteria and more than 10 pus cells per high power field in urine. These sticks were dipped in fresh uncentrifuged urine for one second, when withdrawing wiped along rim of bottle to remove excess of urine. After 60-120 seconds, color of test patch was compared with the color scales on the table on packing material. The presence of nitrite

forming bacteriuria in the urine was shown by pink or red discoloration of the test patch. Pink coloration was indicative of significant bacteriuria. In cases of positive dip stick test; urine culture was performed within an hour of specimen collection. In case this was not possible, samples were refrigerated at 4°C without any preservative. Each specimen was cultured in cysteine-lactose-electrolyte-deficient (CLED) agar plates and incubated at 37°C. After 24 hours a colony count of single uropathogen  $>10^5$  per ml of urine was taken as significant bacteriuria. Mixed growth were taken as having doubtful significance and culture was repeated with fresh sample. Sensitivity of organisms was checked by disk diffusion method. Treatment was provided according to culture and sensitivity report. Deliveries before 37 completed weeks were taken as preterm and birth weight less than 2.5kg at term was regarded as low birth weight. The collected information's were entered into SPSS version 10 and analyzed through its statistical package. The socio, demographic data was presented as simple descriptive statistics like frequencies, and proportions. The disease variables were presented as proportion and subjected to Chi square test as a test of significance, p-value  $<0.05$  was considered as significant.

Urine was tested on each antenatal visit to check for pyuria and nitrite reduction as a guide for retesting urine for culture. All patients were followed throughout their gestation and delivery. Patients with repeated urine infections were advised complete workup of urinary tract 6 weeks after delivery.

## RESULTS

Among 580 women screened for asymptomatic bacteriuria 28 showed a significant colony count with prevalence rate of 4.8%. There was no difference in maternal age, gestational age at the time of initial testing and hemoglobin level of patients with or without bacteriuria. There was significant association between presence of bacteriuria and certain risk factors like, low socioeconomic class, lower education level and multiparity (p-  $<0.05$ ). No significant adverse perinatal outcome were detected in the form of preterm birth and low birth weight (p-  $>0.05$ ). In group with bacteriuria 14.2% women developed cystitis as compare to non bacteriuria group in which only 2.8% developed cystitis (p-  $<0.05$ ) which was statistically significant, while none of the patient developed pyelonephritis.

Table 1 .Mean age, gestational age, and associated risk factors in relation to presence or absence of bacteriuria.(n=580)

Variable	Bacteriuria 28 (4.8%)	No bacteriuria 552 (95.2%)	p-value
Age (years) Mean±SD	26.2±5.0	27.0±4.8	>0.05
Gestational age at initial testing (weeks) Mean±SD	16.6±9.8	17.3±9.9	>0.05
Multiparity	24(85.7%)	373(67%)	<0.05*
Past history of urinary tract infection	10 (35.7%)	19(67.85%)	<0.05*
Low socio economic status	22(78.5%)	319(57.78%)	<0.05*
Education less than middle (class VIII)	19(67.85%)	267(48.3%)	<0.05*

\*Chi square test

Table II. Pregnancy outcome according to presence or absence of bacteriuria (n=580)

Pregnancy outcome	Bacteriuria (n=28)	No bacteriuria (n=552)	p-value
Hemoglobin (gm/dl) Mean±SD	10.0±1.1	10.2± 1.2	(>0.05)*
Preterm delivery (<37 weeks )	3 (10.7%)	49(8.8%)	(>0.05)*
Low birth weight (<2.5kg)	2 (7.14%)	34(6.15%)	(>0.05)*
Patients who Developed Symptomatic U.T.I(cystitis)	4(14.2% )	16(2.89%)	(<0.05)*

\*Chi square test

## DISCUSSION

Asymptomatic bacteriuria is the commonest bacterial infection which requires medical treatment in pregnancy. The prevalence of asymptomatic bacteriuria varies from one community to another. A review of literature revealed a prevalence rate varying from 4% to 23.9% in studies conducted by various authors<sup>13,14,15</sup>. The variation can be attributed to several factors such as geographical variation, ethnicity of the subjects, hygienic practice of the population screened and variation in screening methods. Ablution after micturition and defecation commonly practiced by the Muslim women may have a protective effect against the development of bacteriuria. The prevalence of asymptomatic bacteriuria found in this study was 4.8%. Another study conducted by Maryam Kasraeian among

pregnant women in Shiraz, Iran revealed prevalence rate of 5.4%<sup>12</sup>. These results correlate with the present study.

A cost evaluation study reported that screening for pyelonephritis is appropriate when the prevalence of asymptomatic bacteriuria is greater than 2%<sup>16</sup>. In this study we saw a prevalence of 4.8% and screening of all antenatal women for asymptomatic bacteriuria is recommended. The relationship between asymptomatic bacteriuria and prematurity/low birth weight (LBW) is still a controversial issue, despite many studies. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight was done by Romer R and Oyarzun E, to analyze and combine the results of previous studies to resolve this discrepancy among contradictory results of clinical trials.<sup>17</sup> They concluded a strong association between untreated asymptomatic bacteriuria and LBW/preterm delivery and that antibiotic treatment is effective in reducing the occurrence of LBW. In studying the association of bacteriuria in pregnancy with poor perinatal outcome, we did not find any difference in incidence of preterm delivery and low birth-weight in the two groups with or without bacteriuria ( $p>0.05$ ). There are many factors other than bacteriuria associated with preterm delivery and low birth weight which could have influence these results, but we were unable to study their effects as these data were not collected. Moreover as described in method we provided therapy and close monitoring to all patients with bacteriuria. Hence, it is likely that the lack of association is due to provision of adequate treatment. To establish the association of bacteriuria with poor pregnancy outcome and the effect of therapy, one would have to conduct a randomized trial in which some subjects are allocated to no therapy or placebo. In our study we observed association of certain risk factors in women who developed asymptomatic bacteriuria like low education level, poor socio economic status, past history of UTI and multiparity. In a study conducted by Kovavisarach E revealed strong association of asymptomatic bacteriuria with low education level<sup>18</sup>. Studies conducted by R J Girishbabu and Humera Qudisia showed multiparity as a risk factor for acquiring asymptomatic bacteriuria in pregnancy<sup>13,14</sup>. Low socio economic status also had a significant association with asymptomatic bacteriuria in pregnancy in our study and another study conducted by Goldaber K also showed same association<sup>19</sup>. In our study Coliforms were the most common pathogens (78.57%) associated with asymptomatic bacteriuria with Escherichia coli commonest, and similar results were seen in previously conducted studies<sup>20</sup>.

Quantitative culture is the gold standard for diagnosis of bacteriuria. However pregnant woman with a positive dipstick test is very likely to have a definitive diagnosis of asymptomatic bacteriuria with a positive predictive value of 100% and negative predictive value of 94.55%<sup>14</sup>. So it is cost effective to screen all pregnant women with dipstick method, preferably in the first trimester and those who are positive should be followed up closely after treatment according to culture sensitivity of urine because as many as one third will experience recurrence<sup>21</sup>. It is also recommended that patients with two or more episode of bacteriuria are followed up with monthly repeat cultures until delivery to ensure urine sterility during the pregnancy<sup>22</sup>.

## CONCLUSION

Screening for bacteriuria in pregnancy and proper treatment should be considered as an essential part of antenatal care to prevent complications of asymptomatic bacteriuria.

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