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Original Research Article

A prospective observational study to evaluate prevalence of asymptomatic bacteriuria in pregnancy

Maheshwari Sirasage*, Rajeshwari G., Prema Prabhudev

Department of Obstetrics and Gynecology, SSIMS and RC, Davangere, Karnataka, India

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*Correspondence:

Dr. Maheshwari Sirasage,

E-mail: mahi.praveen2327@gmail.com

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ABSTRACT

Background: Asymptomatic bacteriuria is under-diagnosed condition in pregnancy. Prompt recognition of asymptomatic bacteriuria and its treatment is necessary as this condition can be associated with adverse maternal and foetal complications. Screening of asymptomatic bacteriuria is easy and replicable and goes a long way in promoting safer maternal and foetal outcomes. The aim of the study was to determine (a) prevalence of asymptomatic bacteriuria in pregnant women attending antenatal care and determine its association with age, parity and socio-economic status, and (b) microbiological patterns of the causative organism.

Methods: This was a prospective, observational study that evaluated 200 pregnant women visiting antenatal care in tertiary care hospital, SS Institute of Medical Sciences and Research Centre, Davangere, India. A study was conducted in Department of Obstetrics and Gynecology. Subjects having fever, symptoms of urinary tract infection, underlying co-morbid conditions were excluded from the study. Those willing to give a valid consent with no signs of urinary tract infection were included in the study.

Results: The prevalence of asymptomatic bacteriuria was noted to be 19% in our study. The most common organism noted to cause asymptomatic bacteriuria was noted to be *E. coli* followed by *Staphylococcus aureus*. The prevalence of asymptomatic bacteriuria was noted to be highest in the second trimester followed by those in first trimester.

Conclusions: Asymptomatic bacteriuria is widely prevalent in pregnancy. Pregnant women should be screened every trimester for presence of asymptomatic bacteriuria.

Keywords: Asymptomatic bacteriuria, Antenatal care, Pregnancy

INTRODUCTION

Asymptomatic bacteriuria is a bacterial infection of the urine without presence of the usual symptoms that are known to occur with urinary infection. This occurs in 2-15% of pregnancies. If not treated, up to 30% of pregnant women may develop acute pyelonephritis. This condition has also been associated with low birth weight and preterm birth in neonates thereby leading to adverse maternal-foetal outcomes.¹

Though urinary tract infections affect all the age groups, women particularly those who are pregnant are more susceptible to develop UTI due to their short urethra and

easy contamination of urinary tract from the faecal microbes.²

The most common organism implicated in urinary tract infections in pregnant women is *E. coli* accounting for up to 80% of the cases.^{3,4} Early diagnosis and treatment of urinary tract infection during pregnancy can ensure the safety of the mother and fetus and also prevent complication during delivery.⁵

The aim of the study was to determine the prevalence of asymptomatic bacteriuria in pregnant women attending antenatal care and determine its association with age, parity and socio-economic status. We also determined the microbiological patterns of the causative organism.

METHODS

This was a prospective observational study that evaluated pregnant patients attending antenatal OPD at SS Institute of Medical Sciences and Research Centre, Davangere, India. It was conducted in Department Of Obstetrics And Gynecology, for asymptomatic bacteriuria. The study was conducted during a period of 1 year from 1st June 2020 to 30th June 2021. An informed consent was obtained from the subjects prior to start of the study explaining them the objective and procedure of the study in their native language. Those unwilling to give a valid consent were not included in the study.

Inclusion criteria

Pregnant women with following criteria were included (a) those attending antenatal clinic irrespective of parity; and (b) with no signs and symptoms of UTI.

Exclusion criteria

Patients with following criteria were excluded (a) symptoms suggestive of UTI (flank pain, burning micturition, dysuria); (b) history of fever; (c) diabetics, anaemia, heart disease; (d) subjects who had taken antibiotic therapy recently (within in 7 days); (e) history of urolithiasis; (f) history of preterm delivery, PROM; (g) known case of renal disease and patients with renal anomalies; and (h) multiple pregnancy, hydramnios.

Sample size

A total of 200 subjects were included in the study. Based on prevalence rate of asymptomatic bacteriuria in pregnant women at 18.54% (6) a sample size of 200 pregnant women was considered.

Methodology

After enrolment in the study, demographic data of the participants was noted such as age, parity, current trimester, socio-economic status, etc. A urine sample was collected in sterile conditions and culture and sensitivity of the specimen conducted. Prevalence was calculated and other parameters such as age, parity, socio-economic status and current trimester was correlated.

RESULTS

Significant bacteriuria was identified in 19% of the subjects. 61.5% of the samples were sterile. 34.21% of the participants with positive culture were between 31-35 years followed by 28.95% between 26-30 years. 23.68% of the culture positive participants were between 21-25 years. 52.63% of participants with culture positive samples had studied till high school, 21.05% had completed primary school, 13.16% were illiterates and only 15.79% had completed degree. 34.21% each of the subjects with culture positive samples belonged to class III and class IV

classification as per BG Prasad's classification. 13.16% belonged to class II, 10.53% belonged to class V and 7.89% belonged to class I. 55.26% of the participants with positive culture were in 2nd trimester of gestation followed by 36.84% in 1st trimester. 7.89% were in 3rd trimester. The most common organism isolated was *E. coli* in 71.05%, followed by staphylococcus aureus in 15.79%, *Klebsiella* in 7.89% and streptococcus species in 5.26%.

Table 1: Urine culture results.

Culture	N	%
Significant bacteriuria	38	19
Insignificant bacteriuria	17	8.50
Contamination	22	11
Sterile	123	61.50

Table 2: Prevalence of culture positive sample as per participant's age.

Age distribution (years)	Culture positive	%
18-20	2	5.26
21-25	9	23.68
26-30	11	28.95
31-35	13	34.21
36-40	3	7.89
Total	38	100

Table 3: Educational qualification.

Educational qualification	Culture positive	%
Illiterate	5	13.16
Primary school	8	21.05
High school	20	52.63
Degree holder	6	15.79
Total	38	100

Table 4: Socio-economic class as per BG Prasad's classification.

Socio-economic class	Culture positive	%
I	3	7.89
II	5	13.16
III	13	34.21
IV	13	34.21
V	4	10.53
Total	38	100

Table 5: Trimester.

Trimester	Culture positive	%
First	14	36.84
Second	21	55.26
Third	3	7.89
Total	38	100

Table 6: Bacterial isolate.

Bacterial isolate	Culture positive	%
<i>E. coli</i>	27	71.05
<i>Staphylococcus aureus</i>	6	15.79
<i>Klebsiella</i>	3	7.89
<i>Streptococcus sps</i>	2	5.26
Total	38	100

DISCUSSION

The prevalence of asymptomatic bacteriuria was noted to 19% in our study. In a study by Chandel et al, prevalence of asymptomatic bacteriuria was noted to be 7.34% in a tertiary care hospital.⁷ Sonkar et al in another study from a tertiary care centres evaluated 216 subjects, the prevalence of asymptomatic bacteriuria was noted to be 16.7%. This was comparable to our study.⁸

The most common implicated organism in our study was *E. coli* followed by *Staphylococcus aureus*, *Klebsiella* and *Streptococcus*. Emami et al noted *E. coli*, *Klebsiella*, *Pseudomonas* and *Staphylococcus aureus* to be commonly implicated organisms in cases of asymptomatic bacteriuria in pregnancy.⁹ Tadesse et al in a study noted the prevalence of the asymptomatic bacteriuria at 21.2%.¹⁰ The commonly isolated organisms were *E. coli*, followed by *Klebsiella* and *Proteus*. Gram positive organism included *Staphylococcus aureus*.

Subjects in first and second trimester were majorly identified to have a positive urine culture. 34.21% each of the subjects with culture positive samples belonged to class III and class IV classification as per BG Prasad's classification. The age distribution of the culture positive samples was majorly between 26 to 35 years. 52.63% of participants with culture positive samples had studied till high school, 21.05% had completed primary school, 13.16% were illiterates and only 15.79% had completed degree. Sujatha et al noted highest incidence of asymptomatic bacteriuria in age group of 21-30 years.¹¹ The incidence of asymptomatic bacteriuria was 45.45% in first trimester, 36.36% in second trimester and 18.18% in third trimester which significantly overlapped with our study findings. Susceptibility to bacteriuria can be due to multiple factors that include socio-economic status, personal hygiene, education of the patients, etc.¹¹ Studies have noted that higher level of education is a protective factor for preventing development of bacteriuria in pregnant women.¹² There was lesser prevalence of asymptomatic bacteriuria in upper socio-economic classes. This may be due to better personal hygiene and access to better amenities. This trend was observed in a study by Lavanya et al.¹³

Our study was consistent with prevailing trends pertaining to asymptomatic bacteriuria. It should be noted that urine culture is a simple, easily accessible test. Evaluation and

treatment for asymptomatic bacteriuria would be helpful in improving maternal-foetal outcomes.

We suggest conducting similar studies with a higher patient sample size, long term follow up of patients till delivery to determine maternal and foetal outcomes and cost-effective analysis of the investigations and treatment modalities for widespread implementation of screening for asymptomatic bacteriuria.

CONCLUSION

Asymptomatic bacteriuria is widely prevalent in pregnant women. Regular screening should be conducted in every trimester to check for asymptomatic bacteriuria. Instead of prescribing empirical antibiotics, it is prudent to conduct culture and sensitivity tests. A similar study with higher patient sample size and those having lack of access to tertiary care centres should be conducted to further determine the prevalence and patterns of asymptomatic bacteriuria.

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