Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

Asymptomatic bacteriuria in South Indian pregnant women and treatment effect on outcome of pregnancy

Nalam Neelima[1], Ushadevi Gopalan[1,*], Karthika Jayakumar[2]

[1]*Dept. of Obstetrics and Gynaecology, Shri Sathya Sai Medical College and Research Institute, Ammapettai, Tamil Nadu, India*
[2]*Dept. of Microbiology, Shri Sathya Sai Medical College and Research Institute, Ammapettai, Tamil Nadu, India*

ARTICLE INFO

Article history:
Received 30-01-2021
Accepted 08-04-2021
Available online 25-08-2021

Keywords:
Asymptomatic bacteriuria
Urinary tract infection
Pregnancy outcome

ABSTRACT

Background: Asymptomatic bacteriuria is defined as bacteriuria where colony count of same species is more than 10^5 colonies/ml of urine in a clean catch midstream urine sample in an asymptomatic women". This if left untreated in pregnancy, may progress to pyelonephritis. Due to the physiological and anatomical changes in the genitourinary tract during pregnancy, urinary tract infection is more common in pregnant women. Our aim was to study the effect of asymptomatic bacteriuria on pregnancy outcome and to find the most common organism responsible for asymptomatic bacteriuria in pregnant women.

Materials and Methods: This was a prospective observational hospital based study conducted in the Department of Obstetrics and Gynaecology at a tertiary care teaching hospital. A total of 85 pregnant women were included in the study. Clean catch mid stream urine sample was collected and cultured. The organism was identified and patient was treated according to the antibiotic sensitivity pattern. Patient was followed up till delivery to look for maternal and fetal outcomes.

Results: In our study, the prevalence of ASB in pregnancy was 24.7%. 61.9% were in age group of 18-25 years and 42.9% were 2^{nd} gravida. 85.7% were in 3rd trimester. Of the ASB cases 90.5% had term babies and 85.7% had babies with birth weight of >2.5 Kg.

Conclusion: It is important to do Urine culture and sensitivity in all pregnant women irrespective of the symptoms and gestational age so as to detect ASB as early as possible and by treating this we can avoid the adverse effects in the mother and the fetus.

1. Introduction

Urinary tract is next to respiratory tract in females for acquiring infections.[1] Pregnant women are affected twice as compared to non pregnant women in acquiring urinary tract infections because of the anatomical and physiological changes occurring in pregnancy.[2] Urinary tract infections may be associated with symptoms or without symptoms.[3] In females, urethra is short and located close to the anal canal due to which it can be easily contaminated with fecal microorganisms and thereby increase the chance of urinary tract infections.[3]

Progesterone in pregnancy causes changes such as increased bladder volume, decrease in tone of ureter and bladder. Decrease in peristalsis of ureter causes mild hyderonephrosis and urinary stasis which is favourable for the growth of microorganisms causing Asymptomatic bacteriuria.[4] In the later trimesters as the gravid uterus enlarges it exerts pressure over the urinary bladder leading to rise in intra vesicular pressure, vesico ureteral reflex and retention of urine which provides suitable medium for the growth of bacteria.[4] Glycosuria in pregnancy is due to raised glomerular filterate and inability of the renal tubules

* *Corresponding author*.
E-mail addresses: neelimanalam175@gmail.com (N. Neelima), ushag7@hotmail.com (U. Gopalan).

https://doi.org/10.18231/j.ijogr.2021.067

to completely reabsorb the filtered glucose and it provides good environment for the growth of bacteria in glycosuric urine.[5]

"When a same microorganism with colony count of more than 10^5/ml of urine is obtained in a clean catch midstream urine in a women without symptoms is defined as asymptomatic bacteriuria".[6] Two to eleven percentage of prevalence of asymptomatic bacteriuria have been reported worldwide and in various studies.[6] But India being a developing country, prevalence is more due to lack of knowledge, poor sanitation and genital hygiene in lower socioeconomic groups. Due to lack of awareness of the consequences if left untreated it may lead to complications in mother and fetus.[7]

Untreated Asymptomatic bacteriuria in pregnancy leads to progression into pyelonephritis in few cases.[8] Complications associated with untreated bacteriuria include neonatal complications like low birth weight and preterm babies, intrauterine growth retardation and also increased Perinatal mortality and morbidity. Maternal complications include anaemia, hypertensive diseases, preterm labour, chorio amnionitis, and postpartum endometritis.[6,8] If early diagnosis of this asymptomatic bacteriuria by routine screening is made and treated appropriately these complications can be prevented.[8]

The association between asymptomatic bacteriuria and pre term may be due to the pyrogens which increases the myometrial activity and also the endotoxins produced from the gram negative bacteria has an oxytocic effect on the myometrium. These endotoxins can cross the placenta and can affect fetus and can cause preterm labour. Rupture of membranes and initiation of labour can occur prior due to the bacterial enzymes like proteases and collagenase. Bacterial endotoxins stimulates deciduas which leads to prostaglandin synthesis which in turn leads to onset of labour.[9]

The organism responsible for most of the urinary tract infections is Escherichia coli.[10] Gold standard diagnostic test for asymptomatic bacteriuria is urine culture. Drawbacks of it is time consuming and expensive.[11] Other tests include urine analysis, nitrate test, and leucocyte esterase test which can be used for screening purpose.[11]

Screening the bacteriuria while it is asymptomatic and treating it is far better and worthwhile than treating an established and progressed disease.[12] The high prevalence of bacteriuria in pregnancy and the prevention of adverse complications by providing timely treatment justifies screening for asymptomaic bacteriuria in pregnancy and appropriate treatment with antibiotics.[12]

The aim of our study was to screen for asymptomatic bacteriuria in all pregnant women irrespective of the gestational age, find the prevalence of bacteriuria in our region, to detect the organisms causing asymptomatic bacteriuria, antibiotic sensitivity pattern and to treat them accordingly and follow up till their delivery to look for development of complications in the mother or fetus.

2. Materials and Methods

This was a Prospective Observational Hospital based study conducted at Department of Obstetrics and Gynaecology, at a tertiary care centre, Tamil Nadu. Study was conducted from September 2018 to June 2020.

2.1. Inclusion criteria

Pregnant women of age group 18 – 45 years of any gestational age.

2.2. Exclusion criteria

1. Women with gestational DM/ gestational HTN/any chronic illness.
2. women with known renal diseases.
3. women with symptoms of UTI.
4. Those who are treated with any antibiotics within last 2 weeks of the visit to the hospital.

2.3. Method of collection of data

A total of 85 pregnant patients attending antenatal OPD and inpatients of Department of Obstetrics and Gynaecology were included in the study according to inclusion and exclusion criteria. Study was conducted after getting approval from the ethical committee.

Written informed consent was taken from the selected patients. A detailed history of the patient including demographic data which included age of the pregnant women, SES class, obstetric score, gestational age, presenting complaints and history of antibiotic intake, along with past obstetric, medical, surgical history and family history was taken. Complete general, systemic and obstetric examination was done. General examination was done to look for pallor, icterus, oedema, height and weight. BMI was calculated. BP and Pulse was checked to rule out hypertensive disorders. Obstetric examination was done to look for growth corresponding to the gestational age. Routine investigations were done, which included Hb, TLC, platelet count, RBS, urine routine and urine culture sensitivity. All pregnant women included in the study were counselled regarding collection of clean catch, mid stream urine sample in the sterile wide mouthed leak proof container with lid. The sample was transported to the microbiology department immediately and processed.

Urine routine and Urine C/S was done. Urine routine and microscopy was done to look for urine albumin, sugar, pus cells, epithelial cells and casts. Urine culture is proceeded by a standard loop method where a loop of sample is streaked over the culture media (MacConkey and Blood agar) and incubated at 37^0C for 24 hours to see for any

growth. If growth is present it is further incubated and tests such as gram staining, catalase and oxidase test is done to identify the bacteria. Colony counts yielding bacterial growth of more than or equal to 10^5organisms / ml of pure isolates were considered as significant bacteriuria. The standard Kirby- Bauer disc diffusion method on Muller Hinton agar plate was used for antibiotic sensitivity testing as per CLSI guidelines. Once significant bacteriuria was detected, a course of antibiotic was given for a period of 7 days according to antibiotic susceptibility pattern and follow up is done after 14 days of start of treatment. A repeat urine routine and urine C/S was done and looked for growth of any organism. The patient was followed up till delivery and was observed for the maternal and fetal outcome such as gestational age of the patient at the time of delivery, type of delivery, birth weight of the baby, 1 minute and 5 minutes APGAR score, NICU admission and duration of the stay of the baby in NICU.

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Chi-square test was used as test of significance for qualitative data. ANOVA (Analysis of Variance) was the test of significance to identify the mean difference between more than two groups for quantitative and qualitative data respectively. p value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

3. Results

In the study 21/85(24.7%) had significant bacteriuria, 4/85(4.7%) had Insignificant Growth and 60/85(70.6%) had no growth in urine culture.

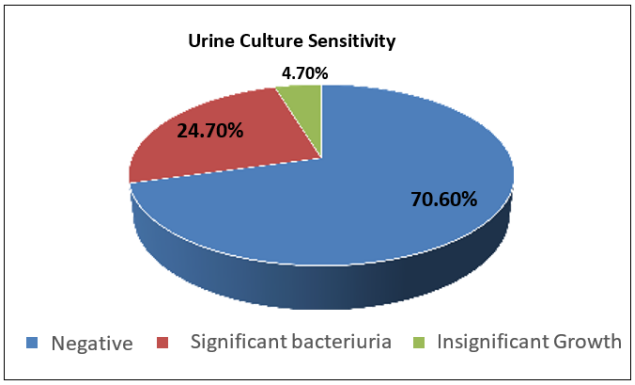

Fig. 1: Showing Urine culture sensitivity distribution among subject

In this study, majority of culture positive cases 16/21 (76.19%) belonged to SES IV, 4/21 (19.04%) belonged to SES III and 1/21 (4.7%) belonged to SES V.

Among subjects with significant bacteriuria, majority 13/21 (61.9%) were in the age group 18 to 25 years followed by 7/21 (33.3%) in age group of 26 -30 years. Among subjects with Insignificant Growth, majority 2/4 (50%) were in the age group 26 to 30 years. There was no significant association between Age and Urine Culture Sensitivity.

We found that among subjects with significant bacteriuria, majority of subjects were 2^{nd} Gravida 9/21(42.9%) followed by Primigravida 8/21(38.1%), 3^{rd} Gravida 2/21 (9.5%) and 4^{th} Gravida & above 2/21(9.5%). Among subjects with Insignificant Growth, majority were Primigravida 3/4(75%). There was no significant association between Parity and Urine culture sensitivity.

In this study among subjects with significant bacteriuria, 18/21(85.7%) were in 3^{rd} Trimester followed by 2/21(9.5%) in 2^{nd} trimester and 1/21(4.8%) in 1^{st} trimester. Among subjects with insignificant growth, 3/4 (75%) were in 3^{rd} Trimester. There was no significant association between Gestational Age and Urine culture sensitivity.

In the study among subjects with significant bacteriuria, majority of subjects had BMI 25 to 29.9 (52.4%) and among subjects with Insignificant Growth, majority of subjects had BMI 25 to 29.9 (50%). There was significant association between BMI and Urine culture sensitivity.

In the study among subjects with significant bacteriuria, majority had Hb 10 to 10.9 gm/dl, 42.9% and among subjects with Insignificant Growth, majority of subjects had Hb >11 gm/dl (75%). There was no significant association between Hb and Urine culture sensitivity.

In the study among pregnant women with significant bacteriuria, 100% had TLC between 4000 to 11000 and in pregnant women with Insignificant Growth, 75% had TLC between 4000 to 11000. There was significant association between TLC and Urine culture sensitivity.

In the study among pregnant women with significant bacteriuria, 5/21(23.8%) had albumin traces in urine and 1/21(4.8%) had 1+ Urine albumin and among women with Insignificant Growth, 2/4 (50%) had Traces of Albumin. There was significant association between Urine Albumin and Urine culture sensitivity.

In the study none of the pregnant women with significant bacteriuria and Insignificant Growth had Urine sugar and Urine casts.

In the study among pregnant women with both significant bacteriuria and insignificant bacteriuria, 100% of them had pus cells </=5 in urine. There was no significant association between Urine pus cells and Urine culture sensitivity.

In the study among pregnant women with significant bacteriuria, 20/21(95.2%) of them had </=5 Urine Epithelial Cells and among subjects with Insignificant Growth, 100% of them had urine epithelial cells </=5. There was no significant association between Urine epithelial cells and Urine culture sensitivity.

In the study among 21 subjects organisms were isolated, of them one patient had two organisms. Most

common organism isolated was E coli (22.7%) followed by Staphylococcus aureus (18.2%), Klebsiella Pneumoniae (9.1%), Klebsiella Oxytoca (9.1%), CONS (9.1%), Citrobacter freundii (9.1%), Pseudomonas species (9.1%), Enterobacter aerogenes (4.5%), Acinobacter (4.5%), and Streptococci (4.5%).

In the study among pregnant women with significant bacteriuria, majority underwent Normal vaginal delivery (47.6%) and among women with Insignificant Growth, 2/4(50%) underwent Normal Vaginal delivery and 2/4(50%) underwent Emergency LSCS.

Among subjects with significant bacteriuria, majority were delivered at Term (81%) and among subjects with Insignificant Growth, majority were delivered at Term (100%). There was no significant association between Urine culture Sensitivity and Maternal outcome.

In the study among subjects with significant bacteriuria, majority were at delivered at term (90.5%) and 9.5% were preterm, 14.3% had low birth weight babies, 90.5% of babies had APGAR score 8 at 1 min, 95.2% babies had APGAR score 9 at 5 min and 9.5% required NICU admission.

Among subjects with insignificant bacteriuria, all of them (100%) delivered at term, all babies had APGAR score 8 at 1 min, 9 at 5 min and none required NICU admission. There was no significant association between perinatal outcome and Urine Culture Sensitivity.

4. Discussion

Asymptomatic bacteriuria is more common in pregnancy and, if left without treatment disease progresses into pyelonephritis and thereby unfavourable maternal and neonatal complications[8]. Our study included 85 cases of which 21 were positive for asymptomatic bacteriuria and were treated for 7 days according to antibiotic sensitivity report. Patients were followed up after completion of the treatment and urine routine and culture repeated in them.

In this study, we had a prevalence of 24.7% of asymptomatic bacteriuria and 4.7% of them had insignificant growth. This is in agreement with the study conducted by Patnaik M et al (25.3%).[13] Other studies showed ASB prevalence of Jennifer P et al,[14](3.6%), Sujatha R et al,[15] (7.2%), Lavanya SV et al,[1] and Mukherjee K et al,[12]showed (8.4%), Radha S et al,[16] (8.25%). On the other hand, highest prevalence of 55% was seen in the study done by Oladeinde et al.[17]

In this study, 74.19% of culture positive cases were from Socio economic status IV, followed by 19.04% from Socio economic status III and 4.7% belonged to Socio economic status V. Most of the culture positive cases were from lower socioeconomic class, and this may be due to poor genital hygiene and poor sanitation measures.[18] This is in agreement with the study conducted by Tahir S et al.[19]

In our study, in 18-25 age group there were 13/21 (61.9%) significant bacteriuria cases and 26-30 year age group had 7/21 (33.3%) of culture positive cases. As per the study done by Harish Babu et al,[20] 18-25 age group had 52.38% of culture positive cases. On the other hand, 61.9% of culture positives cases belonged to 26 – 30 years age group in the study done by Mukherjee K et al.[12] Early marriage, early sexual activity and child bearing could be the reason for the higher incidence of ASB in younger age group as in our study.[21]

In this study, 9/21 (42.9%) of ASB cases were in second gravida followed by 8/21 (38.1%) in primigravida. This is similar to the study conducted by Verma A et al,[22] (59.25%) and Gopalan U et al,[23](72.1%). On the other hand, in the study done by Lavanya SV et al,[1] 66.6% of the ASB cases were primigravida. High incidence in multigravida may be due to the fact that they are repeatedly exposed to urinary stasis which increases the colonization of the urinary tract by micro organisms.[24]

In this study 85.7% of culture positive cases were in third trimester and 9.5% in second trimester. Similar results had been shown by Patnaik M et al,[13] (53.65%). Whereas studies conducted by Sujatha R et al,[15] (45.45%) showed more prevalence of significant bacteriuria in first trimester and studies by Kasinathan A et al,[25](68%) and Mukherjee K et al,[12](42.86%), showed more prevalence of ASB in second trimester. The high prevalence of ASB in third trimester may be due to enlarged gravid uterus causing urinary stasis and also due to poor genital hygiene, providing suitable environment for growth of micro organisms.[26]

In this study 71.4% of ASB cases had nil urine albumin, 23.8% had urine albumin trace. According to the study by Ghamrawi R et al.[27] Proteinuria is either absent or traces of albumin may be there which is physiological in a normal pregnancy.[27]

In this study 10 types of organisms were isolated from 21 culture positive cases. two organisms were isolated from one culture positive case. Gram negative organisms were 66.6% and gram positive were 33.3%. E coli was isolated in 22.7% cases which was the most predominant organism followed by staphylococcus aureus in 18.2% cases. Similar result was obtained by Verma A et al,[22]and GopalanU et al.[23] whereas Enterococcus species was isolated in 26.7% of cases which was the most predominant organism in a study done by Labi A K et al,[28]. In study by Patnaik M et al,[13] Klebsiella Pneumoniae was the most common organism isolated and staphylococcus aureus was isolated in 50% cases by Dhange SC et al.[29] E Coli, the gram negative bacteria was the most predominant organism causing significant bacteriuria in asymptomatic women.[30] E Coli are found in bowel as commensal bacteria which contaminates periurethral region and causes ascending urinary tract infections.[30] Enlarged gravid uterus and progesterone causes urinary stasis which is suitable for growth of Escherichia coli.[31] The pilus

Table 1: Antibiotic sensitivity pattern with respect to organism isolated

		Organism																	
		Staph aureus		**Klebsiella Pneumoniae**		**Klebsiella oxytoca**		**Coagulase Negative Staphylococcus**		**E Coli**		**Enterobacter aerogenes**		**Acinobacter**		**Citrobacter freundii**		**Pseudomonas Species**		**Streptococci**	
		n = 4		n = 2		n =2		n =2		n =5		n =1		n =1		n =2		n =2		n =1	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
S1	Sensitive	4	100.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	NT	0	0.0%	2	100.0%	2	100.0%	0	0.0%	5	100.0%	0	0.0%	1	100.0%	1	50.0%	2	100.0%	1	100.0%
R1	Resistant	0	0.0%	0	0.0%	0	0.0%	1	50.0%	0	0.0%	1	100.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%
S2	Sensitive	0	0.0%	2	100.0%	2	100.0%	0	0.0%	5	100.0%	0	0.0%	0	0.0%	2	100.0%	2	100.0%	1	100.0%
	NT	4	100.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	1	100.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
R2	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S3	Sensitive	4	100.0%	2	100.0%	2	100.0%	0	0.0%	5	100.0%	1	100.0%	1	100.0%	2	100.0%	2	100.0%	0	0.0%
	NT	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
R3	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S4	Sensitive	4	100.0%	2	100.0%	0	0.0%	1	50.0%	4	80.0%	1	100.0%	0	0.0%	2	100.0%	2	100.0%	0	0.0%
	NT	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%	0	0.0%	0	0.0%	1	100.0%
R4	Resistant	0	0.0%	0	0.0%	1	50.0%	1	50.0%	1	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S5	Sensitive	4	100.0%	2	100.0%	2	100.0%	2	100.0%	4	80.0%	1	100.0%	1	100.0%	2	100.0%	0	0.0%	0	0.0%
	NT	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	20.0%	0	0.0%	0	0.0%	0	00.0%	2	100.0%	1	100.0%
R5	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S6	Sensitive	4	100.0%	2	100.0%	2	100.0%	2	100.0%	5	100.0%	1	100.0%	1	100.0%	2	100.0%	2	100.0%	1	100.0%
	NT	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
R6	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S7	Sensitive	4	100.0%	2	100.0%	0	0.0%	2	100.0%	5	100.0%	0	0.0%	0	0.0%	1	50.0%	2	100.0%	0	0.0%
	NT	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	0	100.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
R7	Resistant	0	0.0%	0	0.0%	1	50.0%	0	0.0%	0	0.0%	1	100.0%	1	100.0%	1	50.0%	0	0.0%	0	0.0%
S9	Sensitive	0	0.0%	2	100.0%	2	100.0%	0	0.0%	5	100.0%	0	0.0%	0	0.0%	2	100.0%	2	100.0%	0	0.0%
	NT	4	100.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	1	100.0%	1	100.0%	0	0.0%	0	0.0%	1	100.0%
R9	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S10	Sensitive	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	NT	4	100.0%	2	100.0%	2	100.0%	2	100.0%	5	100.0%	1	100.0%	1	100.0%	2	100.0%	2	100.0%	1	100.0%

S1: Ampicillin, S2:Amikacin, S3: Gentamycin, S4: Nalidixic acid, S5: Norfloxacin, S6: Ciprofloxacin, S7: Nitrofurantoin, S9: Cefotaxime, S10:Vancomycin, S11: Cotrimoxazole, S12: Linezolid, S13: Amoxicillin, S14: Cefepime, S17: Bacteriacin

Table 2:

		Organism																	
		Staph aureus		**Klebsiella Pneumoniae**		**Klebsiella oxytoca**		**Coagulase Negative Staphylococcus**		**E Coli**		**Enterobacter aerogenes**		**Acinobacter**		**Citrobacter freundii**		**Pseudomonas Species**		**Streptococci**	
		n = 4		n = 2		n =2		n =2		n =5		n =1		n =1		n =2		n =2		n =1	
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
R10	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S11	Sensitive	0	0.0%	0	0.0%	2	100.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	2	100.0%	0	0.0%
	NT	3	75.0%	1	50.0%	0	0.0%	0	0.0%	5	80.0%	1	100.0%	1	100.0%	0	0.0%	0	0.0%	0	0.0%
R11	Resistant	1	25.0%	1	50.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
S12	Sensitive	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	NT	4	100.0%	2	100.0%	2	100.0%	0	0.0%	5	100.0%	1	100.0%	1	100.0%	2	100.0%	2	100.0%	1	100.0%
R12	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S13	Sensitive	0	0.0%	2	100.0%	0	0.0%	0	0.0%	5	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	100.0%
	NT	4	100.0%	0	0.0%	2	100.0%	2	100.0%	0	0.0%	1	100.0%	1	100.0%	2	100.0%	2	100.0%	0	0.0%
R13	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
S14	Sensitive	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%
	NT	4	100.0%	2	100.0%	2	100.0%	2	100.0%	5	100.0%	1	100.0%	1	100.0%	0	0.0%	2	100.0%	1	100.0%
R14	Resistant	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

R1		R4		R7		R11		R17	
Ampicillin		Nalidixic acid		Nitrofurantoin		Cotrimoxazole		Bacteriacin	
Count	%	Count	%	Count	%	Count	%	Count	%

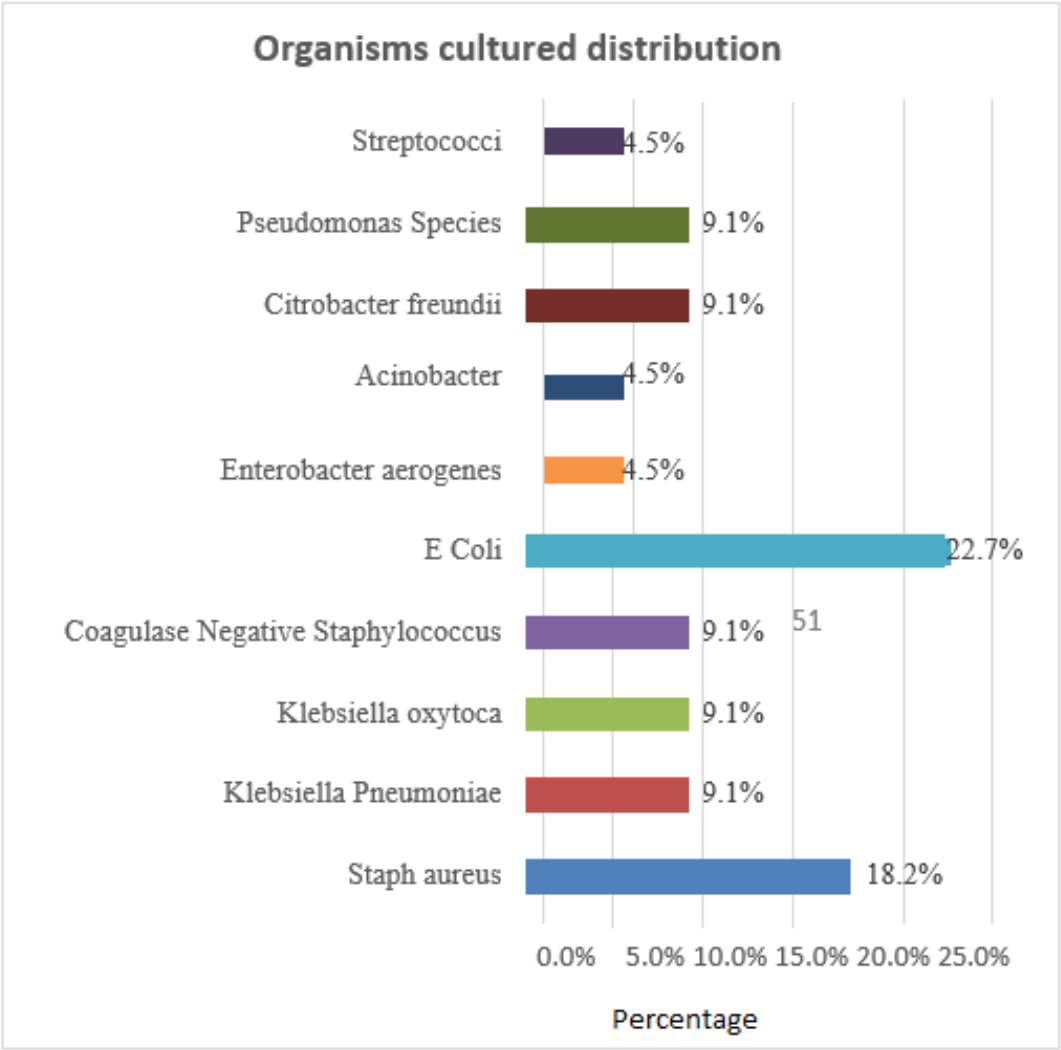

Fig. 2: Showing Organisms cultured distribution

Table 3: Association between Maternal outcome and Bacteriuria

		Urine Culture Sensitivity						
		Significant bacteriuria		Negative		Insignificant Growth		P value
		Count	%	Count	%	Count	%	
Type of Delivery	NVD	10	47.6%	33	55.0%	2	50.0%	0.303
	Elective LSCS	5	23.8%	18	30%	0	0.0%	
	Emergency LSCS	6	28.6%	9	15.0%	2	50.0%	
Gestational age	Preterm	2	9.5%	3	5.7%	0	0.0%	0.759
	Term	17	81.0%	48	90.6%	3	100.0%	
	Post term	2	9.5%	2	3.8%	0	0.0%	

Table 4: Association between Perinatal outcome and Bacteriuria

		Urine Culture Sensitivity						
		Significant bacteriuria		Negative		Insignificant Growth		P Value
		Count	%	Count	%	Count	%	
GA at Birth	Term	19	90.5%	58	96.7%	4	100.0%	0.464
	Preterm	2	9.5%	2	3.3%	0	0.0%	
Birth weight	<2.5 Kg	3	14.3%	5	8.3%	0	0.0%	0.582
	>2.5 Kg	18	85.7%	55	91.7%	4	100.0%	
APGAR Score 1 Minute	7,10	2	9.5%	4	6.7%	0	0.0%	0.774
	8,10	19	90.5%	56	93.3%	4	100.0%	
APGAR Score 5 Minutes	8,10	1	4.8%	1	1.7%	0	0.0%	0.687
	9,10	20	95.2%	59	98.3%	4	100.0%	
NICU admission	No	19	90.5%	58	96.7%	4	100.0%	0.464
	Yes	2	9.5%	2	3.3%	0	0.0%	

adhesions of gram negative bacteria helps in adhering to the uroepithelial lining because of which organsism cannot be easily washed out and the organism multiplies.[30]

In this study, 50% Klebsiella Oxytoca showed resistance to Nitrofurantoin and Nalidixic acid. Klebsiella pneumonia(50%) and Staphylococcus aures(25%) were resistance to Cotrimoxazole. E Coli (20%) showed resistance to Nalidixic acid. Acinobacter (100%) were resistant to Nitrofurantoin. 50% of CONS were resistant to Nalidixic acid and Ampicillin. Streptococci were 100% resistant to Bacteriacin and Cotrimoxazole. 100% of Enterobacter aerogens were resistant to Nitrofurantoin and Ampicillin. 50% of Citrobacter freundii were resistant to Nitrofurantoin and Ampicillin. This pattern of resistance varies from place to place and the rise in this resistance may be due to excessive and irrational use of antibiotics.[32]

For treatment of UTI in pregnancy Nitrofurantoin is the safe and best drug except nearing term as it may lead to deficiency of glucose 6 phosphate in babies which causes hemolysis.[16] Acinobacter (100%), Enterobacter aerogenes (100%), Citrobacter (50%) and Klebsilla Oxytocoa (50%) were resistant to Nitrofurantoin in our study. Staphylococcus aureus, E Coli, CONS and Klebsiella pneumonia were 100% sensitive to nitrofurantoin.

In our study, most of the ASB cases (47.6%) had normal vaginal delivery and 81% of them had term delivery and 9.5% had preterm delivery. 9.5% of newborns of culture positive cases were admitted in NICU. On the other hand in a study by Radha S et al,[16] only 3.03% of newborns were admitted in NICU.

High percentage of term delivery in culture positive cases in our study may be due to early diagnosis and treatment of ASB according to the antibiotic susceptibility pattern. There by we could prevent the adverse outcomes. This is similar to the study done by Jain V et al,[6] where they prevented the adverse maternal and fetal outcomes in those cases where early diagnosis of ASB was made and were treated.

Asymptomatic bacteriuria group in our study had 9.5% preterm babies and 14.3% of babies with birthweight <2.5 kg. In other studies conducted by Radha S et al,[16] they had 18.2% preterm babies and 15.2% of babies with birthweight <2.5 kg.

In our study, 90.5% of babies had 8/10 APGAR score, and 9.5% had 7/10 APGAR score at 1 minute. 95.2% babies had APGAR score of 9/10 and 4.8% babies had APGAR score of 8/10 at 5 minutes. NICU observation and admissions were seen in 9.5% of newborns.

5. Conclusion

The prevalence of ASB in our study was high as compared to the other studies. Urine culture sensitivity even though expensive is considered as the gold standard test to detect ASB. It is important to do urine culture sensitivity in all pregnant women irrespective of symptoms and gestational age so as to detect ASB as early as possible and by early treatment we can avoid the adverse effects in the mother and the fetus.

6. Source of Funding

None.

7. Conflict of Interest

The author declares no conflict of interest.

References

1. Lavanya SV, Jogalakshmi D. Asymptomatic bacteriuria in antenatal women. *Indian J Med Microbiol*. 2002;20(2):105–6.
2. Kerure SB, Surpur R, Sagarad SS, Hegadi S. Asymptomatic bacteriuria among pregnant women. *Int J Reprod Contracept Obstet Gynecol*. 2013;2(2):213–6.
3. Kerure RD, Umashanker. Prevalence of Asymptomatic Bacteriuria among Pregnant women in a teritiary care hospital. *Int J Sci Res Publ*. 2013;3(11):1–4.
4. Misra R. Ian Donald's practical obstetric problems. 7th ed. Wolters Kluwer India Pvt Ltd; 2014.
5. Banda JM, Sheyin CD, Junaid Z, John SA, Mohammed B, Ssd. Prevalence of Asymptomatic Bacteriuria among Pregnant Women Attending Antenatal Clinic at Plateau State Specialist Hospital. *Arch Microbiol Immunol*. 2020;4(3):121–30.

6. Jain V, Das V, Agarwal A, Pandey A. Asymptomatic bacteriuria and obstetric outcome following treatment in early versus late pregnancy in north Indian women. *Indian J Med Res*. 2013;137:753–8.
7. Jayachandran AL, Gnanasambandam U, Balan K, Sangeetha AV, Vijayalakshmi TS. Asymptomatic bacteriuria among antenatal women attending a tertiary care hospital in Kanchipuram: evaluation of screening tests and antibiotic susceptibility pattern. *Int J Res Med Sci*. 2016;4(2):540–4.
8. Mcisaac W, Carroll JC, Biringer A, Bernstein P, Lyons E, Low DE. Screening for Asymptomatic Bacteriuria in Pregnancy. *J Obstet Gynaecol Can*. 2005;27(1):20–4.
9. Kalita D, Deka S. Asymptomatic bacteriuria in pregnancy. *N Indian J OBGYN*. 2015;2(1):8–19.
10. Acharya R. Asymptomatic urinary tract infections among pregnant women attending antenatal clinic at tertiary care hospital. *J Evid Based Med Healthc*. 2019;6(14):1122–4.
11. Baksh ME, Tadi S, Darabi R. Asymptomatic bacteriuria in pregnant women attending Boo- Ali Hospital Tehran Iran: Urine analysis vs. Urine culture. *Electron Physician*. 2017;9:5760–3.
12. Mukherjee K, Golia S, Vasudha CL, Babita, Bhattacharjee D, Chakroborti G. A study on asymptomatic bacteriuria in pregnancy: prevalence, etiology and comparision of screening methods. *Int J Res Med Sci*. 2014;2(3):1085–91.
13. Patnaik M, Panigrahi K, Das B, Pathi B, Poddar N, Lenka PR. Prevalence, risk factors and causative organisms of asymptomatic bacteriuria in pregnancy. *Int J Adv Med*. 2017;4(5):1348–54.
14. Jennifer P, Cyril R, Piyumi P, Nimesha G, Renuka J. Aymptomatic Bacteriuria in Pregnancy: Prevalence, Risk factors and Causative Organisms. *Sri Lankan J Inf Dis*. 2012;1(2):42–6.
15. Sujatha R, Nawani M. Prevalence of Asymptomatic Bacteriuria and its Antibacterial Susceptibility Pattern Among Pregnant Women Attending the Antenatal Clinic at Kanpur, India. *J Clin Diagn Res*. 2014;8(4):1–3.
16. Radha S, Nambisan B, Prabhakaran NK, Jamal S. Prevalence and outcome of asymptomatic bacteriuria in early pregnancy. *Int J Reprod Contracept Obstet Gynecol*. 2017;6(1):223–7.
17. Oladeinde BH, Omoregie R, Oladeinde OB. Asymptomatic Urinary tract infection among Pregnant Women Receiving Ante-natal Care in a Traditional Birth Home in Benin City, Nigeria. *Ethiop J Health Sci*. 2015;25(1):3–8.
18. Imade PE, Izekor PE, Eghafona NO, Enabulele OI, Ophori E. Asymptomatic bacteriuria among pregnant women. *North Am J Med Sci*. 2010;2(6):263–6.
19. Tahir S, Tayyab M, Rasul S, Jabeen S, Gul A. Prevalence of Asymptomatic Bacteriuria, Associated Risk Factors and Adverse Fetomaternal Outcome among Antenatal women attending a tertiary care hospital. *Pak J Med Health Sci*. 2015;9(4):1399–402.
20. Babu BGH, Moinuddin SK, Vinosha, Deb A. Asymptomatic bacteriuria among pregnant women attending tertiary care teaching hospital. *Indian J Obstet Gynaecol Res*. 2018;5(1):68–71.
21. Prabhavathi V, Krishnamma B, Murthy GK, Prasad DKV. Prevalence of asymptomatic bacteriuria among antenatal women and its effects on maternal and perinatal outcome in northern Andhra Pradesh population. *Int J Adv Med*. 2018;5(1):179–85.
22. Verma A, Baheti S, Sharma M. Asymptomatic bacteriuria in pregnancy and its relation to perinatal outcome. *Int J Reprod Contracept Obstet Gynaecol*. 2016;5(12):4390–6.
23. Gopalan U, Rajendiran S, Karnaboopathy. Screening for Asymptomatic bacteriuria in pregnant women. *Indian J Obstet Gynaecol*. 2017;5(3):367–71.
24. Elzayat MA, Vanes AB, Dabour MFE, Cheng F. Prevalence of undiagnosed asymptomatic bacteriuria and associated risk factors during pregnancy: a cross-sectional study at two tertiary centres in Cairo. *BMJ Open*. 2017;7:e013198.
25. Kasinathan A, Thirumal P. Prevalence of asymptomatic bacteriuria in antenatal women attending a tertiary care hospital. *Int J Reprod Contracept Obstet Gynaecol*. 2014;3(2):437–41.
26. Prasanna B, Naimisha M, Swathi K, Shaik MV. Prevalence of Asymptomatic Bacteriuria in Pregnant Women, Isolates and their Culture Sensitivity Pattern. *Int J Curr Microbiol App Sci*. 2015;4(8):28–35.
27. Ghamrawi R, Kattah AG, Garovic VD. Isolated Proteinuria of Pregnancy: A Call for Action. *Kidney Int Rep*. 2019;4:766–8.
28. Labi AK, Yawson AE, Ganyaglo GY, Newman MJ. Prevalence and Associated risk factors of Asymptomatic Bacteriuria in Ante-natal Clients in a Large Teaching Hospital in Ghana. *Ghana Med J*. 2015;49(3):154–8.
29. Dange SC, Shah A, Dravid MN. Asymptomatic bacteriuria in pregnancy. *Int J Res Rev*. 2016;3(3):45–9.
30. Tadesse S, Kahsay T, Adhanom G, Kahsu G, Legese H, Wahid A, et al. Prevalence, antimicrobial susceptibility profile and predictors of asymptomatic bacteriuria among pregnant women in Adigrat General Hospital, Northern Ethiopia. *BMC Res Notes*. 2018;11(1):740.
31. Rao VM, Venkatesh BM, Rao SR. Asymptomatic Bacteriuria in Pregnant Women- Study at a Tertiary Maternity care Hospital in Hyderabad, India. *Int J Curr Microbiol App Sci*. 2018;7(5):1133–42.
32. Kulkarni SR, Peerapur BV, Sailesh KS. Isolation and Antibiotic Susceptibility Pattern of Escherichia coli from Urinary Tract Infections in a Tertiary Care Hospital of North Eastern Karnataka. *J Nat Sci Biol Med*. 2017;8(2):176–80.

Author biography

Nalam Neelima, Resident

Ushadevi Gopalan, Professor

Karthika Jayakumar, Professor and HOD

Cite this article: Neelima N, Gopalan U, Jayakumar K. Asymptomatic bacteriuria in South Indian pregnant women and treatment effect on outcome of pregnancy. *Indian J Obstet Gynecol Res* 2021;8(3):314-322.