

A Prospective Study of Asymptomatic Bacteriuria in Pregnant Women in A Teaching Hospital of Semi Urban Setup



Medical Science

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ABSTRACT

Background: Asymptomatic bacteriuria is the significant number of bacteria in the urine of an individual without symptoms. In pregnancy the apparent reduction in immunity of pregnant women along with stagnation of urine tends to encourage the growth of pathogens. This study was carried out to determine the prevalence of asymptomatic bacteriuria in pregnant women attending the antenatal OP of a teaching hospital of semi urban setup. **Patients and Methods:** Urine of a total of 1334 pregnant women were tested for a possible asymptomatic bacteriuria and identification of isolates and their antimicrobial sensitivity testing was done by standard microbiological techniques. **Result:** A total of 91 women were positive for significant bacteriuria among 1334 pregnant women giving a prevalence rate of 6.82%. Age group 31-35 years had the highest percentage of infection (29.67%) followed by age group 36-40 (25.74%). The dominant organisms were Esch.coli (30.28%) from Gram negative group followed by Staphylococcus aureus (19.72%) from Gram positive group. Gentamicin (88 to 98%) was the most effective against most of the urinary isolates in both gram positive and gram negative isolates followed by amikacin (75% to 94%) and ceftriaxone (67% to 94%) **Conclusion:** Asymptomatic bacteriuria is not uncommon among antenatal patients attending the OPs. All governments and health organizations should make the urine culture mandatory for all antenatal women during their checkups so as to reduce the morbidity and mortality of the newborn due to pyelonephritis and adverse obstetric outcomes such as prematurity, low-birth weight .

INTRODUCTION

Urinary tract infection (UTI) is one of the commonest bacterial infections encountered in daily clinical practice¹. It has been estimated that worldwide about 150 million people suffer from asymptomatic and symptomatic UTIs each year². In most parts of developing parts of the world, UTI is among the most common health problems occurring both in the community and hospitalized patients³. Asymptomatic bacteriuria refers to the presence of bacteria in urine. It is a condition in which urine culture reveals a significant growth of pathogens that is greater than 10⁵ CFU/ml, but without the patient showing symptoms of urinary tract infection⁴. This is common during pregnancy. The apparent reduction in immunity of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms⁵. The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosuria, which encourages bacterial growth in the urine^{6,7}. Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria which could lead to pyelonephritis and adverse obstetric outcomes such as prematurity, low-birth weight⁸, and higher fetal mortality rates^{9,10}. Although UTI may not always lead to complications in the mother, it is still a cause of significant morbidity¹¹. Many researchers suggest routine culture screening for all pregnant women attending antenatal clinic in order to prevent mother and child from any form of complication that may arise due to infection¹². However, in many hospitals in developing countries including India, routine urine culture test is not carried out for all antenatal women due to cost implica-

tion. Therefore an attempt was made to determine the prevalence of asymptomatic bacteriuria in pregnant women attending antenatal clinic in our hospital to know the prevalence, to identify the etiological organisms, determine their relative proportions and their antibiotic sensitivity pattern.

PATIENTS AND METHODS

This present study was carried out at Gayatri Vidya Parishad Institute of Health Care and Medical Technology- a teaching hospital in a semi urban setup. A total of 1,334 pregnant women attending antenatal clinic at the centre were included for assessing for asymptomatic bacteriuria between January 2014 and December 2015. Verbal informed consent was obtained from each patient prior to sample collection. Socio-demographic data were obtained by means of personal interviews. Exclusion criteria included signs and symptoms of UTI, and antibiotic usage within one week. Ethical approval was obtained from the Institutional Ethics Committee. Clean-catch midstream urine was collected from each patient into a sterile universal container. Samples were cultured on dry sterile plates of blood agar and cysteine lactose electrolyte deficient agar (CLED)(Hi-media, Mumbai, India) using standard loop calibrated drop delivering 0.002ml of urine (Semi quantitative method). Plates were incubated aerobically at 37°C overnight. Colony counts yielding bacterial growth of 10⁵ CFU/ml or more of pure isolates were regarded as significant for infection. Similarly, 10ml of each patient urine was transferred into sterile centrifuge tubes and then centrifuged at 3000 rpm for 10-15 minutes. The supernatant was discarded and

the deposit examined microscopically at high magnification for pus cells, red blood cells, epithelial cells, casts, crystals, yeast-like cells and *Trichomonas vaginalis*. Pus cells > 6 per high power field were also considered significant for infection. The isolated organisms from culture plates were identified by using standard laboratory techniques¹³. Antimicrobial in-vitro susceptibility testing was performed using agar disc diffusion method using discs (obtained from Himedia, Mumbai, India) of Amikacin (AK), Cefaclor (CFC), Cefadroxil (CD), Cefoperazone (CFP), Ceftriaxone (CTX), Cefuroxime (CR), Ciprofloxacin (CIP), Gentamicin (G), Nalidixic acid (NA), Netilmicin (NT), Norfloxacin (NR), Ofloxacin (OX) as per Clinical Laboratory Standard Institute (CLSI) 2006 - Performance standards for antimicrobial susceptibility testing; 16th informational supplement M2-A9¹⁵. Cefoxitin was also included for *Staphylococcus aureus* to test Methicillin sensitivity.

RESULTS

In the present study, a total of 91 women were positive for significant bacteriuria among 1334 pregnant women giving a prevalence rate of 6.82%. Age group 31-35 years had the highest percentage of infection (29.67%) followed by age group 19-25 (26.24%) (Table 1). The dominant organisms were *E. coli* (30.28%) from Gram negative group followed by *Staphylococcus aureus* (19.72%) from Gram positive group. *Candida albicans* also isolated in 4.93% of women with UTI. The other organisms isolated included Coagulase negative *Staphylococcus* (11.27%), *Klebsiella* species (12.68%), *Proteus* species (9.15%), *Pseudomonas aeruginosa* (6.34%) and *Enterococcus species* (5.63%) (Table 2). In the present study it was observed that gentamicin (88 to 98%) was the most effective against most of the urinary isolates in both gram positive and gram negative isolates followed by amikacin (75% to 94%) and ceftriaxone (67% to 94%) (Table 3).

DISCUSSION

In the present study, a total of 91 women were positive for significant bacteriuria among 1334 pregnant women giving a prevalence rate of 6.82%. Rates of 4-7% have been reported from Canada⁹ and 7% in Ethiopia¹⁵, 7.3% reported in Ghana¹⁶ and 8.4% from India¹⁷. A higher incidence of 23.9% from the study in Sagamu, Nigeria¹⁸, Benin City, Nigeria, 45.3%¹⁹. 78.7% reported in Abakaliki, Nigeria²⁰ and an incidence of 86.6% earlier reported from Benin City, Nigeria. Nicolle stated that the prevalence rate will be higher among individuals with lower socioeconomic status⁹ that was very clear with the observations from Nigeria. There was a significant difference in the prevalence of asymptomatic bacteriuria with respect to age group (P < 0.0001). Age group 31-35 years had the highest percentage of infection (29.67%) followed by age group 36-40 (25.74%) (Table 1). The aforementioned age groups having the highest infection was also observed in previous studies^(16,20) where as Paul Erhunmwunse Imade et al⁽¹⁹⁾ found that age group 26-30 years had the highest percentage of infection (53.1%). This was closely followed by age group 36-40 (52.5%) and 31-35 (52.1%). The dominant organisms were *Esch. coli* (30.28%) from Gram negative group followed by *Staphylococcus aureus* (19.72%) from Gram positive group. *Candida albicans* also isolated in 4.93% of women with UTI (Table 2). This is similar to the findings in previous studies by Paul Erhunmwunse Imade¹⁹ and Delzel²¹.

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S.No.	Antimicrobial	Gram Positive (52)(36.62%)						Gram Positive(83)(58.45%)							
		S.aureus (28)		Coa.Neg. Staph. (Cons) (16)		Entero. Sps. (8)		Esch.coli (43)		Klebsiella Sps. (18)		Proteus Sps. (13)		Pseudomo. Sps. (9)	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Amikacin	25	89.29	15	93.75	6	75.00	39	90.70	17	94.44	11	84.61	7	77.78

wunse Imade¹⁹ and Delzel²¹. This could be due to the fact that urinary stasis is common in pregnancy and this acts as a good medium for growth of Microorganisms²². The other organisms isolated included Coagulase negative *Staphylococcus*, *Klebsiella* species, *Proteus* species, *Pseudomonas aeruginosa* and *Enterococcus species* (Table 2) They are less common organisms causing UTI. In the present study it was observed that gentamicin was the most effective against most of the urinary isolates in both gram positive and gram negative isolates followed by amikacin and ceftriaxone (Table 3). Similar findings were observed by Turpin et al¹⁶ and Gupta et al²³. It was also noted that most of the UTI subjects were in their first and early second trimesters. This could be because most pregnant women report at the antenatal clinic for registration during these periods. Nicolle⁹ stated that the gold standard in screening for asymptomatic bacteriuria is urine culture in early pregnancy of 12 to 16 weeks gestation. Indeed, the first trimester urine culture remains the screening test of choice²⁴.

CONCLUSION

The apparent reduction in immunity along with stagnation of urine of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms. The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosuria which encourages bacterial growth in the urine. Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria which could lead to pyelonephritis and adverse obstetric outcomes such as prematurity, low-birth weight, and higher fetal mortality rates. Hence all governments and health organizations should make the urine culture mandatory for all antenatal women during their checkups so as to reduce the morbidity and mortality of the newborn.

Table 1: Age distribution among pregnant women showing significant bacteriuria

Age Group in Years	Patients Tested (1334)		Patients with UTI	
	Number	Percent	Number	Percent
19-25	350	26.24	22	24.18
26-30	328	24.59	19	20.88
31-35	469	35.16	27	29.67
36-40	187	14.01	23	25.74
Total	1334	100.00	91	100.00

Table 2: Bacterial and fungal isolates among pregnant women with significant bacteriuria

Organisms isolated	Number	Percent
GRAM NEGATIVE (83)(58.45%)		
<i>Escherichia coli</i>	43	30.28
<i>Klebsiella</i> Species	18	12.68
<i>Proteus</i> Species	13	9.15
<i>Pseudomonas aeruginosa</i>	9	6.34
GRAM POSITIVE (52)(36.62%)		
<i>Staphylococcus aureus</i>	28	19.72
Coagulase negative <i>Staphylococci</i>	16	11.27
<i>Enterococcus</i> Species	8	5.63
FUNGI (7) (4.93%)		
<i>Candida albicans</i>	7	4.93
Total	142	100.00

Table - 3: Antimicrobial Sensitivity Pattern of Bacterial Isolates among pregnant women with significant bacteriuria

2	Cefaclor (CFC)	19	67.86	11	68.75	4	50.00	26	60.47	9	50.00	7	53.85	5	55.56
3	Cefadroxil(CD)	21	75.00	12	75.00	5	62.50	24	55.81	11	61.11	8	61.54	6	66.67
4	Cefoperazone (CFP)	20	71.43	14	87.5	6	75.00	26	60.47	12	66.67	9	69.23	5	55.56
5	Ceftriaxone(CTX)	25	89.29	15	93.75	7	87.50	36	83.72	15	83.33	11	84.61	6	66.67
6	Cefuroxime (CR)	23	82.14	11	68.75	5	62.50	27	62.79	9	50.00	10	76.92	6	66.67
7	Ciprofloxacin(CIP)	16	57.14	9	56.25	4	50.00	21	48.83	11	61.11	8	61.84	4	44.44
8	Gentamicin(G)	26	92.86	15	93.75	7	87.50	42	97.67	17	94.44	12	92.30	8	88.89
9	Nalidix acid(NA)	15	53.57	10	62.5	4	50.00	19	44.19	11	61.11	7	53.85	3	33.33
10	Netilmicin(NT)	19	67.86	13	81.25	6	75.00	29	67/74	14	77.78	9	69.23	5	55.56
11	Norfloxacin(NR)	17	60.71	9	56.25	4	50.00	23	53.49	12	66.67	5	38.46	4	44.44
12	Ofloxacin(OX)	25	89.29	13	81.25	6	75.00	36	83.72	16	88.89	11	84.61	6	66.67

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