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Original Research Article

Frequency of urinary tract infections among pregnant women receiving antenatal care in a tertiary care centre: hospital based cross-sectional study

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ABSTRACT

Background: Urinary tract infections (UTI) are one of the most frequent human bacterial infections, causing substantial morbidity and mortality, with nearly 150 million cases globally per year. The prevalence of UTI (including both asymptomatic bacteriuria and symptomatic infection) in pregnant women in India is reported to range from 3% to 24%. This infection must be adequately diagnosed and efficient treatment must be initiated to prevent maternal and perinatal morbidity.

Methods: This was a hospital based cross sectional study. 625 ante natal women recruited during first visit attending antenatal care outpatient department (ANC OPD). We tested their clean catch mid-stream urine sample for routine, microscopic and culture sensitivity test.

Results: Out of 625 antenatal women frequency of urinary tract infection was 16.2%. 17% women were symptomatic having one or more symptoms indicative of urinary tract infection and 83% women were asymptomatic. Among symptomatic women, 92.5% women showed culture positivity for one or more bacteria whereas in asymptomatic women, culture was positive in 10.8%. *E. coli* followed by *Klebsiella* were the most common isolate identified in both symptomatic and asymptomatic women. On antibiotic sensitivity testing, we found good overall sensitivity of bacteria to commonly used antibiotics such as nitrofurantoin, and norfloxacin but resistant to ampicillin was observed in all women. UTI adversely affects the mother like pyelonephritis, preterm labour and preterm baby and its complications.

Conclusions: It is important to identify presence of UTI during pregnancy by doing urine routine and culture sensitivity test in all antenatal women and administration of appropriate antibiotic to affected women so as to reduce the morbidity both in mother and baby.

Keywords: Antenatal women, Asymptomatic bacteriuria, Urinary tract infection

INTRODUCTION

Urinary tract infections (UTI) are one of the most frequent human bacterial infections, causing substantial morbidity and mortality, with nearly 150 million cases globally per year.¹ The lifetime incidence of UTI in women is 50-60%.² The chance of developing UTI in females is 30 times more than men due to anatomy of the female urinary tract. UTI in pregnant women continue to

pose a clinical problem and challenge for obstetricians and physicians. The prevalence of UTI (including both asymptomatic bacteriuria and symptomatic infection) in pregnant women in India is reported to range from 3% to 24%.³

The uropathogens that cause UTIs during pregnancy are the same as those found in nonpregnant patients. *Escherichia coli* accounts for 80 to 90% of infections.

Other gram-negative organisms such as *Proteus mirabilis* and *Klebsiella pneumoniae* are also common. Gram-positive organisms such as group B *Streptococcus* and *Staphylococcus saprophyticus* are less common causes of UTI.⁴ In a study from South India, Manjula et al found *E. coli* as the most frequently isolated organism (56.79%), followed by *Klebsiella* (19.9%), *Pseudomonas* (6.3%), and *Proteus* (5.8%).⁵ WHO and NICE guidelines state that mid-stream urine culture is the recommended method for diagnosing asymptomatic bacteriuria (ASB) in pregnancy.^{6,7}

Choosing the right antimicrobial agent in right dose and duration is an essential part of managing pregnant patients with UTI. The main evidence for treating asymptomatic bacteriuria in pregnancy to prevent adverse maternal and fetal outcomes resulted from a Cochrane Review in 2000 which showed that when antimicrobial treatment was compared to placebo or no treatment it was effective in clearing asymptomatic bacteriuria [risk ratio (RR) 0.25], reducing risk of pyelonephritis (RR 0.23) and reducing the incidence of low birth weight babies (RR 0.66).⁸

Without treatment, up to 20 to 30% of pregnant women with asymptomatic bacteriuria will develop a symptomatic urinary tract infection (cystitis and pyelonephritis) during pregnancy. Maternal complications of UTI in pregnancy include premature delivery, pre-eclampsia, sepsis and chronic renal disease whereas fetal complications are pre-mature or low-birth-weight infants leading to increase neonatal mortality and morbidity.⁹

Therefore we undertook this study (1) to determine the frequency of urinary tract infections among symptomatic and asymptomatic pregnant women and (2) to identify isolated bacterial uropathogen and their drug sensitivity pattern to selected antimicrobial agents.

METHODS

This cross sectional study was conducted in department of Obstetrics and Gynaecology NKP Salve institute of medical sciences and Lata Mangeshkar hospital Hingna Road, Nagpur A Rural Based Tertiary Care Centre from October 2017 to September 2019 (2 year). 625 antenatal women recruited, after taking approval from Institutional Ethics Committee.

Sample size was determined using the following formula.

$$2 N = 1.962 \times \text{Prevalence} (1 - \text{Prevalence}) / L.$$

L: Allowable error (error max) based on the reported prevalence of 24% in previous studies from India.¹⁰

We used a convenient sampling technique.

Inclusion criteria

All pregnant women having symptomatic or asymptomatic UTI above 18 years of age came to us during their first antenatal visit and willing to participate in the study were included.

Exclusion criteria

Women who had taken antibiotics for any illness within 7 days or presently taking any antibiotics and those who are not willing to participate in this study were excluded.

Written and informed consent was taken from the patients who were ready to participate in the study and who fulfilled inclusion and exclusion criteria. Detailed history was taken including patient's age, address, education, occupation, income was noted. Socioeconomic status was determined by Modified Kuppuswamy Scale, menstrual history, obstetric history, and duration of pregnancy was noted. Specific questions related to symptoms and signs of UTI such as burning micturition, dysuria, fever, flank pain, suprapubic pain, urgency, frequency, haematuria, nocturia were asked. Each participant was carefully asked for relevant history of UTI prior to pregnancy, UTI in previous pregnancy any other history that relates to this study was obtained. Detailed history regarding present ailments and use of medications or antibiotics in last 7 days was obtained. Family history, past history, personal history and relevant history was noted.

All women were subjected to clinical examination, general and systemic examination. Apart from other normal routine antenatal investigations, mid-stream urine routine test, urine culture and sensitivity was done and results were noted. Patients were managed as per hospital protocol. Data was documented in case record form and entered in excel sheet. Confidentiality was maintained.

Collection of urine samples

Women were informed to clean their hands with soap and water and then clean the vulva and perineum with sterile cotton swab soaked in normal saline to reduce the risk of contamination. Clean catch mid-stream urine sample was collected using sterile, wide-mouthed glass bottles with screw cap top. Urine specimen was processed in the laboratory within half an hour of collection. The specimen that could not be processed within two hours was kept in refrigerator at 4°C until it was processed. Urine routine microscopy examination was done in department of the pathology and urine culture sensitivity done in the department of microbiology. Urine culture of microorganisms in urine was done by cysteine lactose electrolyte deficient (CLED) medium/MacConkey agar and blood agar using standard loop by Semi-quantitative method and culture sensitivity test was done by disc diffusion method/by calibrated loop method. The plates were read after 24 h of aerobic incubation at 37°C. They were incubated for another 24 hours before a negative

report was issued. A sample with single organism obtained in counts >10 colony forming units (cfu/ml) was taken as positive for bacteriuria. If any pathogen was identified in urine of asymptomatic women, repeat midstream urine sample was taken and sent for repeat culture and sensitivity test. Sensitivity testing was done using drugs safe in pregnancy namely amoxicillin, ampicillin, cephalexin, cefuroxime, cefotaxime, nitrofurantoin, levofloxacin, imipenem.

Operational definitions³

Urinary tract infection (UTI)

UTI was defined by isolation of one or more pathogen on urine culture of morning mid-stream sample in symptomatic and asymptomatic cases.

Asymptomatic bacteriuria (ABU)

ABU defined as true bacteriuria (more than 100,000 colony forming units (CFU)/ml) in the absence of specific symptoms of acute urinary tract infection.

Symptomatic bacteriuria

Patient having symptoms related to urinary infection and the colony count in a single culture was 10³ or more were considered as symptomatic UTI.

Acute cystitis

It was defined in presence of significant bacteriuria with associated bladder mucosal invasion, and is distinguished from asymptomatic bacteriuria by the presence of symptoms such as dysuria, urgency, frequency, nocturia, haematuria and suprapubic discomfort in afebrile women with no evidence of systemic illness.

Pyelonephritis

The identification of at least 100,000 bacteria/ml of a single uropathogen in a midstream specimen of urine culture with associated inflammation of the renal parenchyma, calices and pelvis in the presence of systemic illness. Symptoms include flank or renal angle pain, pyrexia, rigor, chills, nausea and vomiting.

RESULTS

Out of 625 antenatal women attending obstetrics and gynecology OPD majority of women belonged to age group 21 yr. to 30 yr. mean age was 25.3 year. According to Kuppuswamy scale 29% of the women belonged to be in upper lower class, 26.5 % lower class 21.8% lower middle class and 22.6% in upper middle class.

Mean gestational age in our study participant was 25.3 weeks. 45.8% were in second trimester, 37.9% were in

first trimester, 16.3% were in third trimester. 65.6% women in our study were multigravida whereas 34.4% women were primigravida (Table 1).

Table 1: Distribution of participants as symptomatic and asymptomatic.

Patient groups	Frequency	Percentage
Symptomatic	106	17.0
Asymptomatic	519	83.0
Total	625	100.0

Table 1 shows the distribution of participants according to presence and absence of symptoms of UTI. Out of total 625 participants, 106 women (17%) were having symptoms of UTI whereas 519 (83%) women were asymptomatic (Table 2).

Table 2: Distribution of urinary symptoms in symptomatic women (n=106).

Symptoms and signs	Frequency	Percentage
Dysuria	79	74.5
Burning micturition	58	54.7
Pain in abdomen	43	40.6
Frequent urination	38	35.8
Urgency	35	33.0
Back ache	35	33.0
Fever	29	27.4
Flank pain	27	25.5
Suprapubic pain	15	14.2

Table 2 shows the distribution of urinary symptoms in symptomatic women. Most commonly reported symptom was dysuria (74.5%) followed by burning micturition (54.7%), pain in abdomen (40.6%), frequent urination (35.8%), urgency (33%), back ache (33%), fever (27.4%), flank pain (25.5%) and suprapubic pain (14.2%). As many women had more than one symptom, there was overlap of symptoms (Table 3).

Table 3: Distribution of patients according to presence of UTI.

Patient group	UTI		Total women
	Present	Absent	
Symptomatic	98 (92.45%)	8 (7.5%)	106 (17%)
Asymptomatic	56 (10.7%)	463 (89.21%)	519 (83%)
Total	154 (24.6%)	471 (75.36%)	625 (100%)

Table 3 shows distribution of women according to presence or absence of positive urine culture report in the participants. Out of total 625 women, 154 women had UTI suggesting prevalence of UTI in our study to be 24.6%. From 106 symptomatic women, 92.45% of them had UTI. Out of 519 women who did not have symptoms, 56 i.e. only 10.7% women had UTI. The difference in proportion of patients with UTI in two groups of women

was significant as suggested by p value <0.0001. This shows that if symptoms of UTI are present, there are high chances of UTI but small number of patients (10.7%) can have UTI without urinary symptoms (Table 4).

Table 4 shows the distribution of type of organism in two groups. Among symptomatic and asymptomatic women

with UTI, most commonly isolated organism was *E. coli* (35.7% and 32.1%). Other organisms in two groups of women included *Klebsiella pneumoniae* (14.3% and 17.9%), *Proteus spp.* (9.2% and 10.7%), *P. aeruginosa* (9.2% and 3.6%), *S. aureus* (17.3% and 14.3%), *S. Saprophyticus* (9.2% and 10.7%) and *Enterococcus spp.* (5.1% and 10.7%) (Table 5 and 6).

Table 4: Distribution of type of organism in two groups.

Type of organism	Symptomatic women with UTI n=98 (%)	Asymptomatic women with UTI n=56 (%)
<i>E. coli</i>	35 (35.7)	18 (32.1)
<i>Klebsiella pneumoniae</i>	14 (14.3)	10 (17.9)
<i>Proteus spp.</i>	9 (9.2)	6 (10.7)
<i>Pseudomonas aeruginosa</i>	9 (9.2)	2 (3.6)
<i>S. aureus</i>	17 (17.3)	8 (14.3)
<i>S. saprophyticus</i>	9 (9.2)	6 (10.7)
<i>Enterococcus spp.</i>	5 (5.1)	6 (10.7)
Total 154	98 (100.0)	56 (100.0)

Table 5: Culture sensitivity of bacteria in symptomatic patients (n=98).

Drug	<i>E. coli</i> (n=35)	<i>Klebsiella spp.</i> (n=14)	<i>Proteus spp.</i> (n=9)	<i>P. aeruginosa</i> (n=9)	<i>S. aureus</i> (n=17)	<i>S. saprophyticus</i> (n=9)	<i>Enterococcus spp.</i> (n=5)
NITRO	32 (91.4)	12 (85.7)	0	8 (89.9)	15 (88.2)	9 (100.0)	4 (80.0)
NORF	33 (94.3)	9 (64.3)	0	8 (88.9)	0	0	5 (100.0)
CEFU	18 (51.4)	3 (21.4)	8 (88.9)	8 (88.9)	15 (88.2)	8 (88.9)	5 (100.0)
AMPI	0	0	0	0	0	0	0
AMOX- CLAV	0	5 (35.7)	8 (88.9)	0	0	0	0
IMIPEN	34 (97.1)	9 (64.3)	1 (11.1)	9 (100.0)	0	0	5 (100.0)
CEFT- SULB	0	9 (64.3)	8 (88.9)	8 (88.9)	0	0	5 (100.0)
CIPRO	0	7 (50.0)	1 (11.1)	9 (100.0)	0	0	5 (100.0)
PIPER- TAZO	11 (31.4)	14 (100.0)	8 (88.9)	9 (100.0)	0	0	5 (100.0)
LEVO	11 (31.4)	14 (100.0)	2 (22.2)	9 (100.0)	0	0	5 (100.0)
COTRI	0	6 (42.9)	0	0	15 (88.2)	9 (100.0)	0

Table 6: Culture sensitivity of bacteria in asymptomatic patients (n=56).

Drug	<i>E. coli</i> (n=18)	<i>Klebsiella spp.</i> (n=10)	<i>Proteus spp.</i> (n=6)	<i>P. aeruginosa</i> (n=2)	<i>S. aureus</i> (n=8)	<i>S. saprophyticus</i> (n=6)	<i>Enterococcus spp.</i> (n=6)
NITRO	18 (100.0)	10 (100.0)	0	1 (50.0)	7 (87.5)	6 (100.0)	6 (100.0)
NORF	18 (100.0)	5 (50.0)	0	1 (50.0)	0	0	6 (100.0)
CEFU	5 (27.8)	2 (20.0)	6 (100.0)	1 (50.0)	7 (87.5)	6 (100.0)	6 (100.0)
AMPI	0	0	0	0	0	0	0
AMOX- CLAV	0	5 (50.0)	6 (100.0)	0	0	0	0
IMIPEN	18 (100.0)	5 (50.0)	0	2 (100.0)	0	0	6 (100.0)
CEFT- SULB	0	5 (50.0)	6 (100.0)	2 (100.0)	0	0	6 (100.0)
CIPRO	0	10 (100.0)	0	2 (100.0)	0	0	6 (100.0)
PIPER- TAZO	5 (27.8)	10 (100.0)	6 (100.0)	1 (50.0)	0	0	6 (100.0)
LEVO	5 (27.8)	10 (100.0)	0	2 (100.0)	0	0	6 (100.0)
COTRI	0	5 (50.0)	0	0	7 (87.5)	6 (100.0)	0

Table 5 and Table 6 shows sensitivity pattern of organisms in symptomatic and asymptomatic participants.

Nitrofurantoin (NITRO)

Majority of the participants in both groups showed overall good sensitivity against the isolated organisms except *P. aeruginosa* in asymptomatic patients which showed sensitivity in only 50%.

Norfloxacin (NORF)

Majority of the participants in both groups showed overall good sensitivity against the isolated organisms except *P. aeruginosa* and *Klebsiella pneumoniae* in asymptomatic patients which showed sensitivity in only 50% women.

Cefuroxime (CEFU)

Majority of the participants in both the groups showed overall good sensitivity against the isolated organisms except *E. coli* (51.4% and 27.8% from symptomatic and asymptomatic groups respectively), *Klebsiella pneumoniae* (21.4% and 20% from two groups respectively) and *P. aeruginosa* (50% in asymptomatic women).

Ampicillin (AMPI)

None of the patient in both groups had any organisms sensitive to ampicillin.

Amoxicillin-clavulanic acid (AMOX-CLAV)

Only *Proteus spp.* (88.9% and 100% in symptomatic and asymptomatic groups respectively) and *Klebsiella pneumoniae* (35.7% and 50% women from two groups respectively) were sensitive to amoxicillin-clavulanic acid. Rest of the organisms in both the groups were resistant to amoxicillin-clavulanic acid.

Ciprofloxacin (CIPRO)

100% sensitivity to ciprofloxacin was seen in pseudomonas and enterococcus in symptomatic patients and to both organisms and *Klebsiella pneumoniae* in

asymptomatic patients. Against *Proteus spp.* and *Klebsiella* from symptomatic group, sensitivity was 11.1% and 50% only. Other organisms were found to be resistant to ciprofloxacin.

Imipenem (IMIPEN)

100% sensitivity to imipenem was seen to *Pseudomonas aeruginosa* and *Enterococci* in both the group. It was also 100% sensitive in *E. coli* in asymptomatic and 97.1% sensitive in symptomatic women.

Ceftriaxone-sulbactam (CEF-SULB)

The sensitivity in two groups was 100% against *Enterococci* and against *K. pneumoniae*, *Proteus spp.* *P. aeruginosa* was 100% in asymptomatic women and 64.3%, 88.9% and 88.9% respectively in symptomatic women.

Piperacillin-tazobactam (PIPER-TAZO)

K. pneumoniae, *P. aeruginosa* and *Enterococci* in symptomatic women and in addition to the three organisms, *Proteus spp.* in asymptomatic women showed 100% sensitivity. Sensitivity of *E. coli* was lower in both groups (31.4% and 27.8%).

Levofloxacin (LEVO)

100% sensitivity was seen in *K. pneumoniae*, *P. aeruginosa* and *Enterococci* in both groups. Sensitivity of *E. coli* was lower in both groups (31.4% and 27.8%).

Cotrimoxazole (COTRI)

S. saprophyticus in both groups showed 100% sensitivity whereas 88.2% and 87.5% sensitivity was noted against *S. aureus* in two groups.

DISCUSSION

Out of total 625 women 17% patients were symptomatic having one or more symptoms indicative of UTI and 83% were asymptomatic. Kant et al observed 33.2% pregnant women to be symptomatic and remaining were asymptomatic.³ Assessing symptoms is essential as symptoms assist in reaching the diagnosis in patients with or without UTI.

Table 7: Frequency of UTI in different studies.

Frequency of UTI	Symptomatic women	As asymptomatic women	Overall in total women
Present study	92.45%	10.7%	24.6%
Kant et al³	6.7%	1.7%	3.3%
Bandyopadhyay et al¹²	19.87%	4.34%	-
Jain et al¹³	-	16.9%	16.9%
Mukherjee et al¹⁴	-	8.4%	8.4%
Patnaik et al¹⁵	-	25.3%	25.3%

We observed dysuria (74.5%) was most frequent symptom followed by burning micturition (54.7%), pain in abdomen (40.6%), frequent urination (35.8%), urgency (33%), back ache (33%), fever (27.4%), flank pain (25.5%) and suprapubic pain (14.2%) as symptoms reported by patients from symptomatic UTI group. Anozie et al reported frequent urination (27%), followed

by dysuria (25.2%), nausea-vomiting (18%), fever (10.8%), and suprapubic pain (8.1%) as presenting symptoms of UTI.¹¹ In presence of such symptoms, patients should be assessed for UTI by culture of the urine which will identify patients early and appropriate treatment can be instituted to prevent any complications (Table 7).

Table 8: Type of organisms isolated in urine culture.

Type of organism	Our study		Rizvi et al ¹⁶	Anozie et al ¹¹	Patnaik et al ¹⁵
	Symptomatic	Asymptomatic			
<i>E. coli</i>	35.7	32.1	41.9%	62.2%	23.52%
<i>K. pneumoniae</i>	14.3	17.9	21.7%	11.7%	45%
<i>Proteus spp.</i>	9.2	10.7	6.29%	5.4%	-
<i>P. aeruginosa</i>	9.2	3.6	3.4%	2.7%	3.92%
<i>S. aureus</i>	17.3	14.3	5.9%	13.5%	13.72%
<i>S. saprophyticus</i>	9.2	10.7	6.4%	-	-
<i>Enterococcus spp.</i>	5.1	10.7	3.4%	-	9.80%

Table 7 shows frequency of UTI was found to be 24.6% in our study. Among symptomatic patients, 92.45% women showed culture positivity whereas 7.5% women showed no growth on culture. This is much higher prevalence in symptomatic compared to finding of 6.7% prevalence of UTI reported by Kant et al in symptomatic patients. They further observed the significant association between symptoms and presence of UTI.¹⁰ Bandyopadhyay et al reported UTI prevalence of 19.87% in symptomatic women and 4.34% in asymptomatic women.¹² This indicates that in ANC women who present with symptoms indicative of urinary tract infection should promptly be evaluated for presence of UTI with laboratory cultures. We observed that frequency of UTI in asymptomatic patients in our study was 10.7%. Jain et al reported prevalence of 16.9% in their study in women from Northern India.¹³ A study from Mukherjee et al reported prevalence of asymptomatic bacteriuria as 8.4%.^{11,14} A study from Patnaik et al reported prevalence rate of 25.3% in women from Eastern India.¹⁵ Kant et al reported the same in 1.7% ANC patients.¹⁰ Thus rates of asymptomatic UTI vary in different parts of India. Such variations in reported prevalences are probably differences in geographical locations, social habits of the communities, socio-economic differences and differences in personal hygiene. It can be concluded from this discussion that UTI prevalence varies widely (Table 8).

In symptomatic women *Escherichia coli* (35.7%) was most frequently isolated pathogen followed by *S. aureus* (17.3%), *Klebsiella spp.* (14.3%), *S. saprophyticus*, *P. aeruginosa*, *Proteus spp.* (9.2% each) and *Enterococcus spp.* and *P. aeruginosa* in 7.1% each.

In asymptomatic women *Escherichia coli* (32.1%) was most frequently isolated pathogen followed by *Klebsiella spp.* (17.9%), *S. aureus* (14.3%), *S. saprophyticus*,

Proteus spp. and *Enterococcus* (10.7% each) and *P. aeruginosa* in 3.6%.

Rizvi et al reported *E. coli* (41.9%) as most common bacteria followed by *Klebsiella pneumoniae* (21.7%), *Citrobacter spp.* (7.34%), *Proteus spp.* (6.29%) *S. saprophyticus* and *S. epidermidis* (6.4%), *S. aureus* (5.9%), *Pseudomonas aeruginosa* and *Enterococcus spp.* in 3.4% each.¹⁶ Anozie et al observed *E. coli* in 62.2% cases followed by *S. aureus* in 13.5%, *K. pneumoniae* in 11.7%, *Proteus mirabilis* in 5.4%, and *Pseudomonas* in 2.7% cases.

Antibiotic sensitivity pattern of pathogens in symptomatic patients

Majority of *E. coli* isolates were found to be sensitive to nitrofurantoin, norfloxacin imipenem which are commonly used antibiotics in pregnancy. Lower rate of sensitivity was found with cefuroxime in *Klebsiella spp.* (21.4%) and ciprofloxacin in *Proteus spp.* (11.1%). *Enterococci* were 100% sensitive to most antibiotics including norfloxacin and 80% sensitive to nitrofurantoin. None of the isolated pathogen were sensitive to ampicillin. Patnaik et al reported 100% sensitivity of *Escherichia coli* isolates to Cefepime, Nitrofurantoin and Cotrimoxazole.¹⁵

Sensitivity of *Klebsiella spp.* to different antibiotics was found as: cefepime (95.65%), gentamicin (78.26%), nitrofurantoin (78.26%), norfloxacin (60.86%), cefixime (52.17%), cefpodoxime (47.82%), cefuroxime (47.82%) and cotrimoxazole (43.47%), amoxiclav (39.13%). All the gram-positive isolates were 100% sensitive to nitrofurantoin, cotrimoxazole, linezolid and vancomycin. Rizvi et al reported 100% sensitivity of *Enterobacteriaceae* and *Pseudomonas spp.* to imipenem

and 60% to nitrofurantoin.¹⁶ In *S. aureus* and *S. saprophyticus*, highest sensitivity was reported for oxacillin (65.9% and 66%).

Antibiotic sensitivity pattern of pathogens in asymptomatic cases

Most isolates identified on culture were sensitive to nitrofurantoin, norfloxacin and imipenem suggesting these should be the antibiotic of choice. No isolates were found sensitive to ampicillin. Mukherjee et al reported 66.67% sensitivity of *E. coli* and *K. pneumoniae* to nitrofurantoin. *S. aureus* showed 100% sensitivity to ciprofloxacin, cefotaxime, and ceftriaxone. Patnaik et al reported 100% sensitivity of *Escherichia coli* isolates to Cefepime, Nitrofurantoin and Cotrimoxazole.¹⁵

WHO recommends a 7-day course of antibiotics in asymptomatic bacteriuria patients to prevent the complications.⁹ ACOG guidelines suggest if no options are available, nitrofurantoin can be used in first trimester.¹⁷

CONCLUSION

In this study of 625 antenatal women attending the OPD, frequency of urinary tract infection was 154 (24.6%). Out of 625 antenatal women 17% women were symptomatic having one or more symptoms indicative of UTI and 83% were asymptomatic. Among symptomatic women, 92.45% women showed culture positivity for one or more bacteria whereas in asymptomatic women, culture was positive in 10.7%. *E. coli* followed by *Klebsiella* were the most common isolate identified in both symptomatic and asymptomatic pregnant women. On antibiotic sensitivity testing, we found good overall sensitivity of bacteria to commonly used antibiotics such as nitrofurantoin, and norfloxacin but resistant to ampicillin was observed in all women. UTI adversely affects the mother like pyelonephritis, preterm labour, premature baby and its complications.

So it is important to identify presence of UTI during pregnancy by doing urine routine and culture sensitivity test in all antenatal women and administration of appropriate antibiotic to affected women so as to reduce the development of morbidity both in mother and baby.

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