

Prevalence of asymptomatic urinary tract infection due to escherichia coli among pregnant women attending ANC clinic at BRIMS teaching hospital

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Abstract

Introduction: Urinary tract infection (UTI) due to *Escherichia coli* (*E. coli*) is a common health problem among women. Pregnant women are at increased risk from both symptomatic and asymptomatic UTI because of the physiologic changes associated with pregnancy which may cause complications such as pyelonephritis, chronic renal failure, premature delivery and foetal mortality. Our study aimed to check the prevalence of asymptomatic UTI due to *E. coli* and its antibiotic profile among pregnant women of Bidar district of North Karnataka, India.

Materials and Methods: An independent study was done from January to February 2015 to investigate asymptomatic UTI among pregnant women attending Antenatal care clinic (ANC) of Bidar Institute of Medical sciences (BRIMS) Teaching hospital Bidar. 150 mid-stream urine samples were processed for culture and antimicrobial drug susceptibility testing at Department of Microbiology, BRIMS, Bidar as per the routine microbiological techniques. Diagnosis of UTI was made when there were at least 10⁵ colony forming unit (CFU)/ml of urine. Isolates other than *E. coli* are not considered for this study.

Results: Among 150 samples tested, 65 samples grown *E. coli* with colony count of 10⁵ CFU/ml of urine. (43.33%). The Majority of pregnant women were in their 2nd and 3rd trimester and the mean age of study population was 23.46. The rate of UTI was highest among age group of 20-25 years. *E. coli* isolates showed highest resistance to antibiotics Ampicillin (96.92%), Cefuroxime (55.38%) and ceftriaxone (53.85%). It was uniformly sensitive to routinely used drugs for treatment of UTI.

Discussion: Many Gram negative and Gram positive organisms including Yeast cause UTI in pregnant women. Our study revealed the high prevalence of asymptomatic UTI among pregnant women due to *E. coli* in Bidar (43.33%) as compared to studies conducted in other parts Karnataka. This study also showed the antibiotic profile of *E. coli* to different drugs tested and showed highest resistance to Ampicillin.

Conclusion: Asymptomatic Bacteriuria in pregnant women due to *E. coli* is relatively higher in Bidar district and it showed resistance against commonly used antimicrobial agents. Hence it is strongly recommended to undertake routine urine culture in pregnancy and provide appropriate treatment to reduce its complications.

Keywords: Asymptomatic bacteriuria, ANC, *Escherichia coli*, Prevalence, UTI.

Introduction

Urinary tract infection (UTI) due to *Escherichia coli* (*E. coli*) is common health problem among women and particularly in pregnant women along with anaemia and hypertension which may cause complications such as pyelonephritis, chronic renal failure, premature delivery and foetal mortality. Pregnant women are at increased risk from both symptomatic and asymptomatic UTI because of the physiologic changes associated with pregnancy. During pregnancy, the tendency of UTI increases due to the pressure of the gravid uterus on ureters causing stasis of urine flow and is also attributed to the hormonal and immunological changes during normal pregnancy.^{1,2}

UTI occurs approximately in 5-10 % of all pregnancy^{3,4} in three different forms. Asymptomatic bacteriuria, acute cystitis and or acute pyelonephritis.⁵ The incidence of asymptomatic bacteriuria has been reported between 2-13% in pregnancy all over the world and if not treated, it will increase the frequency of premature delivery and neonates with low birth weight.⁶ Therefore pregnant women should have a routine urine test in pregnancy to avoid complications.

UTI in pregnancy is caused by the same organisms which are responsible for UTI in non-pregnant women. Many Gram negative bacilli are responsible for UTI in pregnancy and among that, *Escherichia coli* accounts for 80-90% of the infections.

This study aimed to check the prevalence of asymptomatic UTI due to *E. coli* and its antibiotic profile among pregnant women of Bidar district of North Karnataka which helps for further studies to keep monitoring continuously on the changing pattern of antibiotic susceptibility of the *E.coli*.

Materials and Methods

An independent study was done from January to February 2015 to investigate asymptomatic UTI among pregnant women attending Antenatal care clinic of Bidar Institute of Medical sciences (BRIMS) Teaching hospital Bidar. 150 Pregnant women were included in this study. A clean catch mid-stream urine samples were collected in a sterile wide mouth container along with information on their maternal age, parity, gravidity and residence by interacting with them. The samples were transported immediately to the laboratory, Department of Microbiology, BRIMS, Bidar and

processed for culture and antimicrobial drug susceptibility as per the routine microbiological techniques. Semi quantitative urine culture using a calibrated loop was used to isolate bacterial pathogens on Blood & MacConkey's agar as per the recommendations of Kass.^[7] The plates were incubated at 37°C for 24 hrs and further incubated to 48 hrs in culture (growth) negative cases. Further, the isolates were identified by standard biochemical tests and diagnosis of UTI was made when pathogens were there at least 10⁵ colony forming unit (CFU)/ml of urine. Isolates other than *E. coli* are not considered for this study.

Antibiotic sensitivity testing: Antibiotic sensitivity testing was done on Muller Hinton agar by using Kirby Bauer's disc diffusion method^[8] using antibiotic discs (HI MEDIA, Mumbai) Nitrofurantoin (NIT 300mcg), Netilmicin (NET 30mcg), Piperacillin Tazobactem (PIT 100/10 mcg), Ampicillin (AMP 10mcg), Ofloxacin (OFX 5mcg), Chloramphenicol (C 30mcg), Gentamicin (GEN 10mcg), Imipenem (IPM 10mcg), Cefepime(CPM 30mcg), Cotrimoxazole(COT 25mcg), Cefuroxime (CXM 30mcg), and Ceftriaxone (CTR 30 mcg) as per CLSI guidelines.^[9]

Results

Among 150 samples tested, 65 samples grown *E.coli* with colony count of 10⁵ CFU/ml of urine. (43.33%). The majority of pregnant women were in their 2nd and 3rd trimester (1st trimester- 6.2%, 2nd - 14.53%, 3rd - 22.6%). Mean age of the study population was 23.46 and the rate of infection was highest among the age group of 20-25 years. Among infected, 69.2% living in urban locality and 30.76% in rural areas. Most of them attend ANC unit on need and not regularly.

The *E.coli* isolates showed highest resistance to the antibiotics Ampicillin (96.92%), Cefuroxime (55.38%) and Ceftriaxone (53.85%) and uniformly sensitive to other routinely used antibiotics for the treatment of UTI.

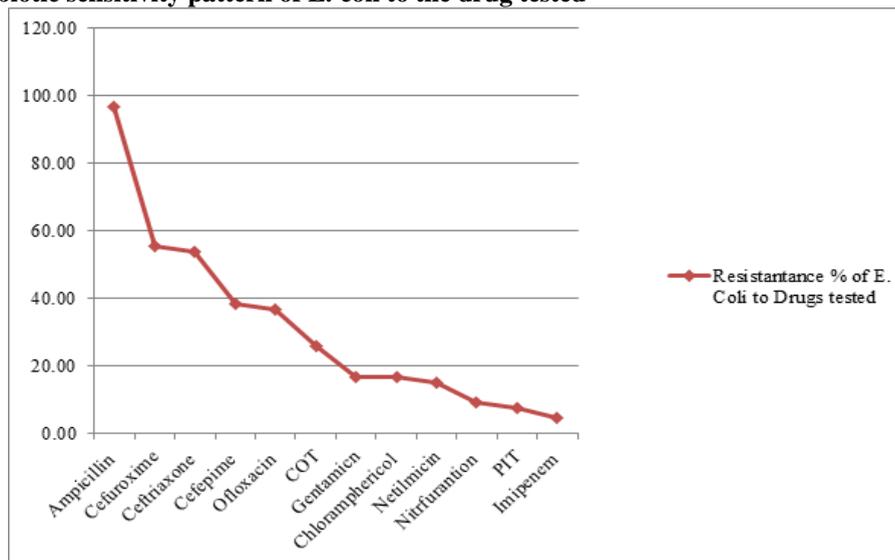
Table 1: Obstetric characteristics of infected women

Trimester	Infection %
1 st	6.2 %
2 nd	14.53 %
3 rd	22.6 %

Table 2: Age wise infectivity rate

Age group	Infection %
15-20	21.54
21-25	49.23
26-30	15.38
31-35	9.23
36-40	4.62

Graph 1: Antibiotic sensitivity pattern of *E. coli* to the drug tested



Discussion

UTI is the most common infection in hospital and community settings. Different factors have been documented to contribute to UTI among pregnant women. These include age, parity, gestation age and level of education.¹⁰ Many gram negative and gram positive organisms including yeast cause UTI in

pregnant women. Our study revealed the prevalence of asymptomatic UTI among pregnant women due to *E.coli* in Bidar district and found to be high (43.33%) as compared to the studies conducted in other parts of Karnataka with commonest isolated pathogen as *E.coli*.¹¹ Annie Rajaratnam et al conducted the same

study in Mangalore, Karnataka and the overall prevalence was found to be 13.2%.¹²

Many studies have been done in India on asymptomatic bacteriuria (ASB) in pregnant women and the incidence was found between 5 and 12% and in western studies, the incidence ranges from 2-7%.^{13,14} Our study revealed the highest infection rate of UTI in pregnant women among age group of 20-25 years which has close proximity to the age wise infection rate findings in other studies done in India.^{15,16}

In present study, among *E.coli*, 90.76% isolates were sensitive to Nitrofurantoin and 83.07% to Chloramphenicol and 73.84% to Cotrimoxazole. These drugs can therefore be used in our setting for the treatment of suspected UTI in pregnant women to avoid further complications.

Conclusion

Asymptomatic Bacteriuria among pregnant women due to *E. coli* is relatively higher prevalence in Bidar district and majority of *E.coli* showed resistance to commonly used antimicrobial agents. Hence it is strongly recommended to undertake routine urine culture in pregnancy and provide appropriate treatment to reduce its complications. Further, periodic studies on this are recommended to monitor any changes in the susceptibility patterns of uropathogenic *E.coli* causing UTI in pregnant women.

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