

PREVALENCE OF URINARY TRACT INFECTION IN PREGNANT WOMEN

Dr. Nawaz Umar, Dr. Siddesh Basavaraj, Sirwar

1. Assistant Professor, Department of Microbiology, Khaja Banda Nawaz Institute of Medical Sciences, Gulbarga Karnataka.
2. Professor, Department of Microbiology, Khaja Banda Nawaz Institute of Medical Sciences, Gulbarga Karnataka.

CORRESPONDING AUTHOR

Dr. Nawaz Umar,
C/O Mohd Umar "Ayesha Mansion",
Near Baogi Hospital, Aiwan Shahi colony,
Gulbarga, Karnataka 585102,
E-mail: drnawazumar@gmail.com,
Ph: 0091 9945270149.

ABSTRACT: Urinary tract infection is one of the most frequently seen medical complications in pregnancy. UTI in pregnancy is an important concern, as it possesses risk of complications such as acute and chronic pyelonephritis, toxemia, anaemia, hypertension, intrauterine growth retardation and increased perinatal mortality. The detection of bacteriuria allows an approach to be made for the prevention of chronic urinary disease in the community and to avoid complications in pregnancy at an early stage. **OBJECTIVES:** (1) To study the prevalence of bacterial pathogens causing urinary tract infection among pregnant women; (2) To evaluate the sensitivity of the screening test with culture. **MATERIALS AND METHODS:** A total of 500 samples were investigated from pregnant women aged between 18 to 35 years, with varying gravida and from all three trimesters were included in a period of one year i.e., from January to December 2011. The samples were collected aseptically from women attending the antenatal clinic at the Khaja Banda Nawaz Hospital, Gulbarga. Urine was collected in the sterile urine container. Both macroscopic and microscopic examination was done. Screening tests like Griess Nitrite test and TTC tests were done. Culture was done by standard loop technique.

RESULTS: The prevalence rate of UTI in pregnancy was 10.40% i.e., with significant bacteriuria (1,00,000 or more bacterial count/ ml of urine) by Kass concept. The incidence of bacteriuria increased along with age and rising parity. Incidence was similar during all three trimesters. Gram's staining, TTC and Griess nitrite gave 88.46%, 73.07% and 57.69% respectively correlate with culture positive bacteriurics. **CONCLUSIONS:** UTI, the most commonly seen complications in pregnancy was 10.4%. Early treatment of bacteriuria not only averts the occurrence of other complications, but also diminishes the risk of premature and perinatal mortality.

KEYWORDS: Bacteriuria; Urinary tract infection; Pregnancy.

1. INTRODUCTION: Urinary tract infection in women is more prevalent and is one of the most frequently seen medical complications in pregnancy¹. Ideal pH, temperature and constituents like glucose present in urine predispose to bacterial growth². During pregnancy, urethral compression at the pelvic brim by the enlarging uterus leads to stasis of urine, incomplete emptying and residual urine, which is the single most important factor that can initiate the proliferation of microorganisms³. Patients with UTI present with classical symptomatology of frequency, urgency, urinary tenesmus, and fever or it may be completely without any symptoms (asymptomatic bacteriuria)⁴.

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The detection of bacteriuria allows an approach to be made for the prevention of chronic urinary disease in the community and to avoid complications in pregnancy at an early stage.

2. MATERIALS AND METHODS: The objective of the study was to know the prevalence of UTI in pregnant women.

A total of 500 urine samples were collected from pregnant women attending KBN Hospital and subjects comprised of varying ages from 18 to 35 years during January to December 2011. Subjects from varying gravida and from all three trimesters were included.

1. COLLECTION OF URINE: Subjects were instructed to collect midstream urine sample with all aseptic precautions in sterile urine container.

2. EXAMINATION OF URINE:

a) Macroscopic examination: Urine was observed by naked eye for altered colour, presence of turbidity, deposit and the findings were recorded.

b) Microscopic examination:

- I. A drop of uncentrifuged urine was allowed to air dry. The smear was Gram stained and examined under oil immersion. Twenty fields were examined. Presence of at least one organism per field was considered as significant ($\geq 10^5$ /ml organisms)¹³.
- II. For the microscopic examination of urine 10 ml of urine was transferred into conical centrifuge tube. The urine was then centrifuged at 1500 rpm for 5 minutes. The supernatant was decanted, to have sediment suspended in 1 ml volume of urine. This preparation was examined in low and high power. Several fields were searched to identify and count the number of cells, crystals and casts. More than 10 pus cells per high power field were considered as significant⁵.

3. SCREENING TESTS:

i) Griess Nitrite Test: 1 ml of urine was taken in a clean sterile test-tube. One ml of 10% potassium nitrate was added and incubated at 37°C for two hours. To this one ml of Griess nitrite reagent was added i.e., solution-A: Sulphanilic acid and solution-B: α -naphthylamine. Development of pink to dark red colour indicates positive test¹⁴.

ii) Triphenyl tetrazolium chloride test (TTC): 2 ml of urine was taken in a sterile test tube and 0.5 ml of working triphenyl tetrazolium chloride reagent was added. This mixture was incubated at 37°C for four hours. Formation of red precipitate indicated a positive test¹⁵.

4. PLATING OF URINE SAMPLES:

STANDARD LOOP TECHNIQUE: Plating of urine was done by standard loop technique on blood agar, nutrient agar and McConkey's agar.

METHOD:

- I. Flame a calibrated wire inoculating loop and allow it to cool without touching any surface.
- II. Mix the urine thoroughly and remove the top of the container.
- III. Insert the loop vertically into the urine to allow urine to adhere to the loop.
- IV. Spread the loopful of urine without flaming or re-entering urine, loop is drawn across the entire plate, crossing the first inoculum, which is the centre streak numerous times to produce isolated colonies.
- V. Incubate plates for at least 24 hours at 37°C. Colonies are counted on each plate. The number of CFU's is multiplied by 1000 (if a 0.001ml loop is used) to determine the number of microorganisms per millilitre in the original specimen⁶.

3. RESULTS: Out of the 500 urine samples collected from pregnant women attending the antenatal clinics, every sample was subjected to routine urine analysis including microscopic examination. Among these 500 samples, the present study revealed that 52 pregnant women had significant bacteriuria (1,00,000 or more bacteria/ ml of urine) giving a prevalence of 10.4%.

Age wise distribution in pregnant women with bacteriuria is shown in table-1. It can be concluded that the incidence of bacteriuria increased with age among the pregnant women. Similarly a positive association is observed between parity of women and bacteriuria. As majority i.e. 24.4%(11 out of 45) of grand multi para had bacteriuria followed by 10.52% (8 out of 76) with 3rd gravid, 8.7% of (19 out of 217) primi and 8.64% (14 out of 162) of second gravid had bacteriuria. The incidence was almost thrice when compared to that in the primigravida. Table-2 reveals that significant bacteriuria during pregnancy had a similar incidence during all the three trimesters.

Significant proteinuria was present in 75% (39) of bacteriuric cases. However, 13.46% (7) of the bacteriuric women did not show any proteinuria, 11.54%(6) bacteriuric women revealed a trace of proteinuria.

Table-3 reveals the correlation of the Gram negative isolates and Gram positive bacteria to the screening tests viz., TTC and Griess nitrite. The TTC test gave an overall better correlation as compared to the Griess nitrite test. However, the correlation with Gram positive bacteria was very poor, being 26.92%. With Gram negative bacilli, it was better, being 46.15%. The Griess nitrite test gave a even more poor correlation, being 38.46% positive with Gram negative bacilli, and 19.23% positive with Gram positive bacteria. Table-4 shows the comparison of other screening method with standard loop technique.

4. DISCUSSION AND CONCLUSION: From this study, the prevalence of UTI in pregnancy was 10.4%. Hitherto the studies conducted reveal that the prevalence of bacteriuria during pregnancy ranges from 3-12.8%. This variation is related to factors like socioeconomic status of the group of women studied^{11,12}.

It was observed that increasing age or greater parity is associated with a higher frequency of significant bacteriuria⁷. In the present study the incidence of bacteriuria in all the 3-trimesters was not much different, being 10.9% in the 1st trimester, and 10.12% and 10.45% in the second and third trimesters respectively.

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The TTC test gave a 73.07% correlation with culture positive bacteriuria and Griess nitrite gave a 57.69% positive correlation with culture positive bacteriuria. These two tests could be supportive to culture for bacteriuria, but not conclusive on their own.

The observations made by Simmon and Williams⁸ and Kincaid Smith et al⁹, for the prevalence of TTC test positive was 94% and 79% respectively. Our findings of TTC test positivity of 73.07% and nitrite test of Griess gave a positivity in 30 cases of bacteriurics (57.69%).

Mere isolation of microorganisms from the urine does not always mean infection, organisms has to be 1,00,000 or more/ ml of urine. When qualitative estimation is carried out indicating growth and multiplication of the organisms in the urinary bladder³, Gram positive cocci multiply slowly in the urine as compared to Gram negative bacilli. It has been suggested by Pead et al¹⁰ that 10^4 organisms/ ml of uncentrifuged urine in case of Gram positive cocci should be considered consistent with urinary infection instead of 10^5 bacteria/ ml, which is appropriate for Gram negative bacilli¹³.

Significant bacteriuria during pregnancy has not yet been accorded the status of a disease despite the isolation of almost similar type of bacterial flora as in the symptomatic cases. However, this study will serve as a reference for researchers interested in this field. Controlled trials and large-scale studies are required to establish pathogenic potential of the isolates. This study has revealed that screening for bacteriuria during pregnancy is an appropriate investigation and that culture was the most effective means of detecting bacteriuria, which may help in the prevention of complications associated with UTI in pregnant women.

Table-1: Age Distribution in Pregnant Women with Bacteriuria

Age (years)	Total No. of samples screened	Cases with Bacteriuria	
		No.	Percentage
18-20	89	7	7.86
21-25	203	20	9.85
26-30	166	16	9.64
31-35	38	6	15.78
35 & above	4	3	75.00
Total	500	52	10.40

Table-2: Relationship of Duration of Pregnancy and Bacteriuria

Trimester	Total No. of samples screened	Cases with Bacteriuria	
		No.	Percentage
First	55	6	10.90
Second	158	16	10.12
Third	287	30	10.45
Total	500	52	10.43

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Table-3: Correlation of Screening Tests with Culture Positive Bacteriurics

Bacteriuric cases on culture	TTC test positive		Griess Nitrite Test	
	No.	Percent	No.	Percent
Gram negative bacilli	24	46.15	20	38.46
Gram positive bacteria	14	26.92	10	19.23
Total	38	73.07	30	57.69

Table-4: Technique wise distribution of cases with significant bacteriuria in comparison with Standard Loop Technique

Name of Technique	No. of Cases	Percentage
Standard loop technique	52	100.00
Gram staining	46	88.46
TTC test positive	38	73.07
Griess nitrite test positive	30	57.69

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