

Prevalence of Urinary Tract Infection in Pregnant Women in a Tertiary Care Hospital of Odisha

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Abstract: Urinary tract infection (UTI) is one of the most common medical complication among pregnant women due to several anatomical factors and hormonal changes. A cross sectional study was conducted in the department of microbiology MKCGMCH, ODISHA between October 2017 to March 2018 to investigate the prevalence of UTI among pregnant women. UTI was diagnosed by growth of atleast 10^5 colony forming units/ ml of a uropathogen in a culture of MID STREAM URINE. The isolated bacteria were identified by various biochemical tests. Escherichia coli was the most common isolated uropathogen. Urine should be cultured routinely among pregnant women for screening and diagnosis purpose for all pregnant women.

Key words : Urinary tract infection, pregnancy, Escherichia coli

Conflict Of Interest : Nil

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I. Introduction

UTI is a major health problem, it has been reported among 20% of the pregnant women and is the most common cause of admission in obstetrical wards¹. Urinary tract infections (UTIs) are the second most common infections in community practise. Incidence of UTI is higher in women than men, 40 to 50 percent of whom will suffer at least one clinical episode during their lifetime². Due to several anatomical and hormonal changes, pregnant women are more susceptible to develop Urinary tract infections (UTI)³. Symptomatic and asymptomatic bacteriuria have been reported among 17.9% and 13.0% pregnant women, respectively⁴. The increase risk factor for UTI in women may be due to short urethra, absence of prostatic secretions, pregnancy and easy contamination of urinary tract with faecal flora⁵. Approximately 90% of pregnant women develop ureteral dilatation, which will persist until delivery⁶. It may contribute to increased urinary stasis and ureterovesical reflux. Additionally, the physiological increase in plasma volume during pregnancy decreases urine concentration and up to 70% of pregnant women develop glycosuria, which is considered to encourage bacterial growth in the urine^{6,7}. Thus UTIs are the most common bacterial infections during pregnancy, with pyelonephritis being the most common severe bacterial infections complicating pregnancy. The members of family Enterobacteriaceae, are the most frequent pathogens detected, causing 84.3% of the UTI⁸. Investigating epidemiology of UTI (prevalence, risk factors, bacterial isolates) during pregnancy is fundamental for care givers and health planners to guide the expected interventions.

II. Material And Methods

This study was carried out in the department of Microbiology, MKCG MEDICAL COLLEGE, Berhampur on no of pregnant women suspected with URINARY TRACT INFECTION (UTI) for a period of 6 months (OCT 2017 – NOV 2018). Freshly voided midstream urine sample were collected in a sterile container from the individuals whose preliminary routine urine tests were positive for pus cells and albumin. All the urine samples were processed within one hour after the collection for aerobic bacterial culture. When delayed, samples were refrigerated and processed within 4 - 6 hours. Over all 560 urine samples were collected from women in different stages of pregnancy. Semiquantitative urine culture using a calibrated loop was done

on CYSTEINE LACTOSE ELECTROLYTE DEFICIENT agar. Following the recommendations of Kass⁹ in distinguishing genuine infection from contamination, culture of a single bacterial species from urine sample at a concentration of $>10^5$ CFU/ml were considered significant. Only a single positive culture per patient was included in the analysis. The plates were incubated at 37°C for 24 hrs. Further, the isolates were identified by cultural, morphological and biochemical tests. The method used in the identification and characterisation of isolated bacteria included Gram staining, motility test and biochemical tests like, TSI and IMViC according to Cheesbrough^{10,11}.

III. Results

Of the 560 urine samples examined in this study, 277 were found to have significant bacteriuria. Urine microscopy of these samples revealed >10 pus cells/high power (40×) field. Overall incidence of UTI in pregnant women was found to be 49.4%.

Overall incidence of UTI in relation to age ranged from 44% to 53%, women in the age groups of 26 - 35 years showed highest incidence (53%) **Table 1**.

Based on parity (number of pregnancy), women in their 3rd and above pregnancy had a greater number of UTI (54.8%), followed by first pregnancy (48.4%) and the lowest incidence of UTI (43.3%) was seen in the second pregnancy **Table 2**.

While, the incidence of UTI by trimester as shown in **Table 3**, women in their 3rd and 2nd trimester had a greater number of UTI cases having an incidence of 54.1% and 43.3% respectively than in the first trimester (25%).

Among 277 bacterial isolates obtained from 560 urine samples, majority of the isolates (99%) were Gram negative bacteria which included *Escherichia coli* (56.79%), *Klebsiella* spp (19.9%), *Pseudomonas* spp (6.3%), *Proteus* spp (5.8%), *Acinetobacter* spp (4.8%) *Enterobacter* spp (3.8%), *Citrobacter* spp (1.4%) and Gram positive isolate being *Enterococcus* spp (0.9%) as shown in **Table 4**.

IV. Discussion

Bacteriuria, either symptomatic or asymptomatic, is common in pregnancy. If left untreated, 20% - 30% of asymptomatic bacteriuria will lead to acute pyelonephritis. This may result in low birth weight of infants, premature delivery cases and occasionally stillbirth, so it is a serious threat to both the mother and foetus¹². UTIs during pregnancy may increase the risk of cerebral palsy or mental retardation. Therefore, careful monitoring of the UTI infections among pregnant women becomes necessary¹³.

Pregnant women are more susceptible to UTI because of increased urinary content of amino acids, vitamins, and other nutrients, which encourage the persistence of infection¹⁴. Physiological increase in plasma volume during pregnancy decreases urine concentration and most of (70%) pregnant women develop glycosuria which is considered to encourage bacterial growth in urine⁶. In addition, some maternal defence mechanisms are less effective during pregnancy¹⁵.

The incidence rate of UTIs in pregnant women in this study population was found to be 49.4% which is nearly at par with the study by Okonko et al.,¹⁶ who reported an incidence rate of 47.5% in pregnant women. However the prevalence rate of UTI has been reported to be comparatively less in other countries like 38% in Iran, 28.5% in Pakistan, 14.2% Saudi Arabia, 10.6% in Turkey, 30% from Yemen¹⁷. The finding of this study is less than the incidence rate of 58% and 71.6% in similar studies among pregnant women in two different towns of Nigeria^{18,19}. This may be due to poor personal and environmental hygiene, low socio economic status, lack of awareness of health care. Reports from India on the incidence of UTIs in the non pregnant women vary from 10% - 40%, from Aligarh 10.8%²⁰, 16.3% from Tamilnadu²¹ and 40.4% from Imphal, Manipur²².

This study also shows that 54.8% of women who had UTI were in their 3rd pregnancy and above with high incidence rate. Our results on incidence of UTI by parity revealed that the higher incidence was found in women who were in their 3rd pregnancy and above. Results of this study are almost comparable to the results reported by Okonko 2009¹⁶ from Nigeria. So, parity is one of the possible factors affecting the prevalence and incidence rate of UTI among pregnant women.

Due to progressive obstruction of the urinary tract, it is expected that the highest frequency of UTIs is in 3rd trimester rather than 2nd and 1st trimester. This study reporting very less incidence of UTI among the women in their 1st trimester (25%) compared to the reports from Nigeria (42.5%)¹⁶, however, it is slightly more when compared to reports from Yemen (17.1%)¹⁷. Incidence rate of UTI in 2nd trimester (43.3%) and 3rd trimester (54.15%) of our study are comparable with reports from Nigeria by Okonko¹⁶ and lower incidence was reported by Al Haddad 34.1% and 48.8% respectively¹³. From earlier reports and our own results revealed that more than 50% incidence of UTI in pregnant women occurs in the 6th and 7th month of their pregnancy. Our results regarding the age of infection, gestation and parity concur with the other reports^{16,17}. Increased parity, age and gestational age increases the risk of UTI in pregnant women. Mainly Gram negative bacteria belonging to Enterobacteriaceae were isolated from urine samples of pregnant women. The most predominant uropathogen

was *Escherichia coli* accounting for 56.79% was seen in our study in comparison to most frequently isolated organism in Britain (65.1%) and in two US studies by Sahm et al., in 2001²³. This finding is similar to other reports which suggest that gram negative bacteria, particularly *E. coli* are the commonest pathogens isolated from patients with UTI^{18,24}. The incidence of *E. coli* in our study was higher when compared with the Nigerian studies reporting 42.10%¹⁶ and 51%²⁵. Most of the studies conducted in Africa and Arab countries showed less than 50% isolation of *E. coli* from the UTI patients but reported a higher percentage (29%) of *S. aureus* as second most frequently isolated bacteria from UTI cases. Reports from other developing or developed countries were the isolation of Gram positive bacteria as uropathogen is very low <10%^{20,21,22}.

The second commonest uropathogen isolated in our study was *Klebsiella* species (19.9%) followed by *Pseudomonas* species (6.3%), *Proteus* spp (5.8%), *Acinetobacter* spp. Other pathogens isolated were *Enterobacter* (3.8%), *Citrobacter* (1.4%), *Enterococcus* spp (0.9%). In contrast to this finding, one study from Aurangabad showed *Klebsiella* as the most common isolate followed by *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*²⁶.

Our results agree with reports from research workers in other countries, with minor differences, which could be due to differences in the environment, social habits of the community, the standard of personnel hygiene and differences in health care^{27,28,29}.

V. Conclusion

There was high prevalence of UTI among pregnant women in this setting regardless to women's age, parity and gestational age. This study highlights the need to raise awareness of UTI and to expand services for prevention of UTI during pregnancy by maintaining hygienic conditions.

Table 1 : Incidence Of UTI In Relation To Age

AGE (IN YEARS)	NO. TESTED (%)	NO. POSITIVE (%)	NO. NEGATIVE (%)
18 – 20	14.3	48.3	51.6
21-25	31.17	53	46.9
26- 30	36.45	47.3	52.6
31- 35	10.79	44.4	55.5
36-45	7.19	53.3	46.6
TOTAL	560	277	283

Table 2: Incidence Of UTI By Parity

NO. OF PARITY	NO. TESTED	NO. POSITIVE (%)
1 ST	260	48.4
2 ND	110	43.3
3 RD AND MORE	190	54.8
TOTAL	560	277 (49.4%)

Table 3: Incidence Of UTI By Trimester

TRIMESTER PERIOD	NO. TESTED	NO. POSITIVE (%)
I ST	115	25
II ND	172	43.4
III RD	273	54.15

Table 4: Bacterial Isolates From Samples

ISOLATE	NO. OF POSITIVE SAMPLES (%)
<i>Escherichia coli</i>	56.79
<i>Klebsiella spp.</i>	19.9
<i>Pseudomonas spp.</i>	6.3
<i>Proteus spp.</i>	5.8
<i>Enterobacter spp.</i>	3.8
<i>Acinetobacter spp.</i>	4.8
<i>Citrobacter spp.</i>	1.4
<i>Enterococcus spp.</i>	0.9

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