# A Study Of Bacteriological Profile In Urine Sample Of Pregnant Patients Diagnosed As Threatened Preterm Labour

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**ABSTRACT**

**Background:** Preterm laboris a challenging issue contributing to perinatal morbidity and mortality all over the world. Preterm labour has multifactorial ethology, but it has been found that 40% of all cases of spontaneous preterm labour and preterm birth are linked to infections, the most common being Bacterial Vaginosis.

**Aim and Objective:** The present study was aimed to study bacteriological profile in urine sample of pregnant patients diagnosed as threatened preterm labour

**Methodology:** This case control observational study was conducted at Santosh Medical College and Hospital, Ghaziabad, between the periods of 19th April 2019 and 30th september2020. There were 120 pregnant women recruited out of which 60 women with threatened preterm delivery were considered in the case group, whereas; the remaining 60 antenatal women that had crossed 37 weeks, but less than 40 weeks of gestation, and had no pregnancy complication during the course of the present pregnancy were included in the control group. Data collection was done by screening the pregnant women based on the patient history, examination and laboratory findings.

**Result:** In control group and case group, majority of patients were between the age of 25 to 29 years, that is 51.7% and 48.3% respectively. 21.66% patients in control group were primigravida and 78.33% were multigravida, where as in the case group 18.3% were primigravida and 81.7% were multigravida. Urine culture in control group was sterile in 96.66% of the patients and 3.33% had E. coli, where as in case group 26.66% had E. coli.

**Conclusion:** Pregnant women must be screened and treated for urogenital infections at their first antenatal appointment in order to reduce the risk of premature labor, preterm birth, and the associated maternal and fetal morbidities.

**Keywords:** Urinary tract infections, Preterm labor, Escherichia coli.

## INTRODUCTION

Urinary tract infections (UTIs) are one of the major causes of morbidity and co-morbidities in patients with underlying conditions, and it accounts for the majority of the reasons for hospital visit globally. The prevalence of disorders related to urogenital system is seen in both male and female, but slightly higher in case of female (Rodríguez et al. 2019) [1]. ACOG defines preterm labor as onset of regular uterine contractions associated with cervical changes between 28 to 37 completed weeks of gestation. It is the leading cause of neonatal morbidity and mortality. Preterm birth is the cause of 85% of the total neonatal morbidity and mortality. [2-4]

Giraldo et al. (2012) [5] in this regard stated that colonisation by microorganisms in the vaginal region of pregnant women are common and the most common infections are caused by bacteria such as Mycoplasma hominis, Gardnerella vaginalis, Trichomonas vaginalis, group B streptococcus (GBS). Patel, Jani, and Kakani, (2015) [6] also identified other organisms like Escherichia coli, Klebsiella pneumonia, Candida albicans, and Streptococcus agalactiae. Uropathogenic Escherichia coli or UPEC is the dominant infectious agent in both uncomplicated and complicated urogenital tract infections. Endometritis and pelvic inflammatory disease usually result from ascending vaginal or cervical infections they present as an abnormal vaginal discharge that may have an unusual odour along with pruritus mostly caused by infections of Candida albicans or Trichomonas vaginalis or Gardnerella vaginalis mobilencus sp. or from the Bacteroides group. [7-9]

Urinary tract infections are very common during pregnancy. Escherichia coli are the most common pathogen isolated from pregnant women. Pregnant women who develop urinary tract infections with group B streptococcal infection have mainly shown preterm delivery as well as preterm labour (Ovalle and Levancini, 2001) [10]. Pregnant women easily develop urinary tract infection (UTI) because of functional, hormonal and anatomical changes and also because of the location of the urethral meatus, which allows uropathogenic bacteria (found in rectal flora) access from the vagina to the lower urinary tract. Therefore the rationale of the study is the need to explore different types of microorganisms or microbial colonies that are found in the urogenital system of pregnant women. This will help to understand the source of the infection as well as understand the risks from each type of microbe.

## MATERIALS AND METHODS

This case control study was conducted at Department of Obstetrics & Gynaecology, Santosh Medical College and Hospital, Ghaziabad over the period from April 2019 to September 2020. A total of 364 patients were initially screened for the inclusion in the study.

The sample population of the study was all pregnant women visiting the department of obstetrics & gynaecology. Initially a total of 364 pregnant women were screened out of 971 recorded patients. A total of 120 subjects were selected randomly as per inclusion and exclusion criteria. Patients with genital tract malignancy and other obstetric complications were not excluded from case group. Well

informed consent was taken in the language understood by patient. The patients were divided into 2 groups.

Group I consisted of 60 pregnant patients diagnosed as threatened preterm labor and preterm labor between 28 to 37 completed weeks of gestation.

Group II consisted of 60 pregnant women with 37 weeks of gestation or more with no history of preterm labor.

Descriptive information mainly comprised of demographical information, information on obstetrics history, physical measures like BMI and others. All women were evaluated by detailed history compiled with special emphasis to previous history of preterm labor, previous bad obstetric history and urogenital infections. All women underwent general physical, systemic, and obstetrical examinations.

Sample from posterior fornix of vagina was taken with two sterilized swabs under direct vision using Cusco/Sims speculum before first vaginal examination and was studied for gram stain characteristics, culture-sensitivity by standard methods and saline wet mount for BV, VC, Trichomoniasis. Midstream urine sample was sent for cytology and culture-sensitivity. Microbiological analysis and antimicrobial sensitivity testing of urine and high vaginal swab was done in the Department of Microbiology at our institute. Women admitted with preterm labor were put on tocolytics (where required), or steroids therapy (<34 weeks of gestation).

The results obtained in the study were compiled and presented in tabulated manner. Statistical analysis was done using chi-square via SPSS software. P value <0.05 was considered statistically significant.

## RESULTS

The present prospective case control study was conducted among 120 women in the department of obstetrics and gynaecology in Santosh Medical College & Hospital. The subjects were divided into 2 groups- case group (60 women) and control group (60 women).

**Table1: Demographic data distribution of study subject.**

| Demographic Distribution | | Number (Percentage) | |
|---|---|---|---|
| | | Control(n=60) | Case(n=60) |
| Age Group(Years) | 20-24 | 24 (40%) | 27 (45%) |
| | 25-29 | 31 (51.7%) | 29 (48.33%) |
| | >30 | 5 (8.33%) | 4 (6.66%) |
| Parity | Primigravida | 13 (21.66%) | 11 (18.33%) |
| | Multigravida (>2) | 47 (78.33%) | 49 (81.66%) |
| Body Mass | Underweight | 18 (30%) | 32 (53.33%) |

| Index (BMI) | Normal | 34 (56.66%) | 22 (36.66%) |
|---|---|---|---|
| | Overweight | 6 (10%) | 6 (10%) |
| | Obese | 2 (3.33%) | 0 (0%) |

According to Table 1, In control group and case group, majority of patients were between the age of 25 to 29 years, that is 51.7% and 48.3% respectively. 21.66% patients in control group were primigravida and 78.33% were multigravida, where as in the case group 18.3% were primigravida and 81.7% were multigravida. According to BMI, in control group majority of patients (56.66%) were in Normal category, whereas in the case group majority of the patients (53.33%) were underweight.

**Table2: Urine routine microscopy and Urinary tract infection in patients.**

| Urine Routine and Urinary Tract Infection | | Number (Percentage) | | P value |
|---|---|---|---|---|
| | | Control(n=60) | Case(n=60) | |
| Urine routine microscopy | HighPCcount | 8 (13.33%) | 35 (58.33%) | 0.0001(S) |
| | LowPCcount | 52 (86.66%) | 25 (41.66%) | |
| Urinary tract infection | Present | 8 (13.3%) | 35 (58.3%) | 0.0001 (S) |
| | Absent | 52 (86.7%) | 25 (41.6%) | |

Urine routine microscopy shows high PC count (Pus Cell) only in 3.3% of patients in control group where as in the case group 58.3% of the patients reported with high Pus cell count (>5 per high power field). There was significant (p=0.0001) difference in urine routine microscopy between cases and controls. It was found that in control group 13% patients had Urinary Tract Infection (UTI) where as in case group 58.3% patients had UTI. There was significant (p=0.0001) difference in UTI between cases and controls.

**Table 3: Bacteriological profile in urine sample.**

| Microorganisms Identified | Number (Percentage) | | Pvalue |
|---|---|---|---|
| | Control(n=60) | Case(n=60) | |
| E.coli | 5 (8.33%) | 16 (26.66%) | NA |
| Klebsiella | 2 (3.33%) | 5 (8.33%) | |
| Candida | 0 (0%) | 3 (5%) | |
| S.aureus | 0 (0%) | 6 (10%) | |
| sterile | 53 (88.33%) | 30 (50%) | |

As shown in Table 3, Urine culture in control group was sterile in 96.66% of the patients and 3.33% had E. coli, where as in case group 26.66% had E. coli, 8.33% had klebsiella, 5% had candida and S. aureus was found in 10% of the patients.

## DISCUSSION

Preterm labor (PTL) is defined as inception of labor with integral membranes after 28 weeks and before 37 weeks of gestation. About 6-8% of all deliveries are preterm and of these about two thirds occur between 34 to 37 weeks of gestation. Prematurity is a one of the most important cause of neonatal and infant morbidity and mortality and many times it occurs unexpectedly in low risk women.

The pathogenesis of preterm labor is not properly understood but multi-factorial etiology has been postulated. A significant amount of evidence suggests that preterm labor is mediated via infection and inflammation (Lumley, 1993) [11]. Urogenital infections contribute significantly to the preventable causes of preterm labor (Verma Indu et al, 2014) [12].

The current case control study was conducted at Department of Obstetrics & Gynaecology, Santosh Medical College and Hospital, Ghaziabad with the objective to study bacteriological profile in urine sample of pregnant patients diagnosed as threatened preterm labor.

In our study, in control group and case group, majority of patients were between the age of 25 to 29 years, that is 51.7% and 48.3% respectively. In the study by Patel et al (2015) [6], the mean age group was 22.88 years in cases (preterm labor) while it was 23.82 years in control group. In the study by Nsereko et al (2020) [13], the mean age of the participants was $28.12 \pm 6.01$ years; 82.8% (n = 303) of the participants were between the ages of 20 and 35 years.

In our study 21.66% patients in control group were primigravida and 78.33% were multigravida, where as in the case group 18.3% were primigravida and 81.7% were multigravida. This finding is in agreement with the study by Patel et al (2015) [6] in which in case group, primipara women were 72% while in control group, it was 74%. In previous studies, there was an association between nulliparous women as well as previous preterm delivery or previous abortion and PTL (Ezechi et al, 2003 [14]; Kozuki et al, 2013 [15]).

In the present study, according to BMI, in control group majority of patients (56.66%) were in normal category, whereas in the case group majority of the patients (53.33%) were underweight. There was significant (p=0.03) difference in BMI between cases and controls. Nsereko et al (2020) [13] found that most of the women had a BMI within the normal range 71.9%.

In this study, urine routine microscopy shows high PC count (Pus Cell) only in 3.3% of patients in control group where as in the case group 58.3% of the patients reported with high Pus cell count >5 per high power field. There was significant (p=0.0001) difference in urine routine microscopy between cases and controls. Verma Indu et al (2014) [12] showed urinary tract infection in 13.46 % and genital tract infection in 21.15 %, while one woman had both cultures positive.

In the present study, urine culture in control group was sterile in 96.66% of the patients and 3.33% had E. coli, where as in case group 26.66% had E. coli, 8.33% had klebsiella, 5% had candida and S. aureus was found in 10% of the patients. In the study by Ghunage et al (2017) [16], in urine culture test for micro-organism, infection was present in 11 (22%) preterm labor patients while in only 3 (6%) full term labor patients. In 39 (78%) preterm labor patients urine culture was shown negative while 47(94%) full term labor patients had negative urine culture. It was statistically significant as p value was< 0.05. Nsereko et al (2020) [13] reported that the most frequent UTI strain was Escherichia coli (60%; n = 27). Additionally, 21.5% (n = 79) of women were diagnosed with Chlamydia; (5.2%, n = 19) with Trichomonas vaginalis; (21.5%, n = 79) with Candida albicans (21.5%, n = 79); and (19.6%, n = 72) were diagnosed with bacterial vaginosis.

Our study found that in control group 13% patients had Urinary Tract Infection (UTI) where as in case group 58.3% patients had UTI. This difference was found to be statistically significant (P=0.0001). Ghunage et al (2017) [16] found that urinary tract infection was present in 11 (22%) women in group A while it was only 3 (6%) in group B. The difference was statistically significant (<0.01).

## CONCLUSION

In this study, the prevalence of UTIs from patients attending hospitals in Ghaziabad District, was found to be 43/120. Escherichia coli and sterile are the major causes of UTIs among patients attending hospitals. In our study we found that urogenital tract infection was 3.2 (75%) times more in case group then in control group. Urine culture in control group was sterile in 96.66% of the patients and 3.33% had E. coli, where as in case group 26.66% had E. coli, 8.33% had klebsiella, 5% had candida and S. aureus was found in 10% of the patients.

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