



Original Research Article

Study of association of urinary tract infection with preterm labour

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ABSTRACT

Preterm labour is the onset of labour before 37 weeks and after 28 weeks of gestation as observed by regular uterine contractions leading to progressive cervical changes. UTI is one of the many etiological factors of preterm labour. In pregnant women UTIs are classified either as asymptomatic bacteriuria (ASB), or symptomatic infections such as acute cystitis and acute pyelonephritis. The objective of this study is to study the prevalence of UTI in preterm labour in relation to selected variables of interest like age, parity, socio economic status, literacy and background.

525 cases of preterm labour were studied in a period of 18 months from December 2019 to June 2020 in the Department of Obstetrics and Gynaecology, Trichy SRM Medical College Hospital. Clean catch midstream urine samples were collected from all cases. Two samples were collected and subjected to microscopic examination and culture and sensitivity.

158 cases were found to have UTI which was more prevalent among the illiterate and lower socio economic class population. It was found that UTI was more prevalent among multipara in the age group of 25 to 29 years. E-coli was the most common organism isolated (69%).

Majority of the cases were booked and from rural background. Around 1.3% of cases were complicated by pyelonephritis.

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1. Introduction

Preterm labour is defined as the onset of labour before 37 completed weeks of gestation after the period of viability. Of the many problems in obstetrics preterm labour poses a unique pressure to the obstetricians mostly for its adverse perinatal outcome. The perinatal morbidity and mortality is 2-7 times that of term pregnancy. Preterm neonate suffers many complications during and after delivery. Hence early diagnosis and management of etiological factors is necessary.

Preterm births are multifactorial in origin. In many of the cases etiology is obscure. Chorioamnionitis, UTI, anatomical defect of uterus, placental abnormalities and defect in conceptus are the important known causes of preterm labour. Hydramnios, multiple pregnancy, malpresentation,

serious maternal disease, psychological problems are other etiological factors.

The most common bacterial infection encountered during pregnancy is urinary tract infection. The urinary tract is specially vulnerable to infections during pregnancy because of various reasons. Dilatation of urinary collecting system, mechanical obstruction of ureter and bladder by the gravid uterus causing hypotonia, congestion and some degree of vesicoureteric reflux (VUR) are few of the gestational changes in the urinary tract which lead to increased predisposition of UTI in pregnancy. Similarly as in non-pregnant women, in pregnant women UTIs are classified either as asymptomatic bacteriuria (ASB), or symptomatic infections such as acute cystitis, acute pyelonephritis, when bacteria invade urinary tract tissues, inducing an inflammatory response. The UTIs in pregnancy are by definition considered complicated infections and require a special diagnostic approach and management.

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UTI is diagnosed by clinical findings of bacteriuria (bacteria in midstream urine in counts of > 10⁵ colony forming units (cfu)/mL) along with symptoms reported by the patient.¹ Cystitis which is infection of bladder is characterized by increased frequency of micturition, painful micturition and urgency. Pyelonephritis which involves infection of one or both the kidneys is characterized by fever and flank pain in addition to symptoms of cystitis. Asymptomatic bacteriuria is defined as presence of bacteria in urine (greater than 10⁵ CFU/ml) in the absence of any symptoms. Pyelonephritis in pregnancy leads to poor outcomes in both the mother and child, including preterm labour, low birth weight, and perinatal death. Cystitis in pregnancy is associated with increased risk of maternal hypertension, anaemia, amnionitis, preterm labour and low birth weight.² In developed countries where routine screening and treatment of bacteriuria in pregnancy is done, only a small percentage of pregnant women progress to pyelonephritis.³

In majority of cases (70 to 90%), *Escherichia coli* is the causative organism.⁴ The pathogenic virulence of this organism which is plentiful in faeces appears to derive from a number of factors, including resistance to vaginal acidity, rapid division in urine, adherence to cell, and production of chemicals which decrease ureteric peristalsis and inhibit phagocytosis. *Klebsiella*, *Proteus mirabilis*, *Coagulase negative staphylococci*, *Pseudomonas* and Group B streptococci are the other organisms isolated from infected urine. Bacteriuria cause preterm labour by a mechanism involving placental and decidual lysosomal breakage with liberation of enzymes capable of increasing local prostaglandin production.

Asymptomatic bacteriuria occurs in 2 to 10% of pregnant women and symptomatic urinary tract infections including cystitis and pyelonephritis may complicate around 4% of pregnancies.^{5,6} More importantly 25 to 40% of asymptomatic patients eventually develop symptom if they remain untreated.⁶

Hence early detection and management of urinary tract infections may effectively prevent complications of preterm labour including preterm birth.

All women should be screened for UTI at the first antenatal visit. Once diagnosed it should be promptly treated with suitable antibiotic which is sensitive yet safest.

2. Aims and Objects

To study the prevalence of urinary tract infections in preterm labour in relation to selected variables of interest.

3. Materials and Methods

3.1. Study design

Cross sectional study.

3.2. Study setting

The study was a hospital based study and was carried out in the Department of Obstetrics and Gynaecology, Trichy SRM medical college hospital, Irungalur, Trichy.

3.3. Study period

Study period was over a period of 18 months from December 2019 to June 2020.

3.4. Study population

Women with spontaneous preterm labour admitted in the department of Obstetrics and Gynaecology, Trichy SRM medical college hospital who fulfill the inclusion criteria and exclusion criteria.

3.5. Inclusion criteria

Patients in preterm labour that is, those patients who are less than 37 weeks of gestation and more than the period of viability with regular uterine contractions occurring once in every 5-8 minutes or less accompanied by one or more of the following:

1. Progressive changes in cervix.
2. Cervical dilatation of more than or equal to 1cm.
3. Cervical effacement of more than or equal to 80%.

3.6. Exclusion criteria

1. Cases with uterine anomalies and congenital anomalies of fetus.
2. Cases of intrauterine fetal death.
3. Cases with chronic systemic diseases like uncontrolled hypertension, diabetes, nephritis and decompensated heart lesions.
4. Induced preterm labour.
5. Patients who were already on antibiotics.

3.7. Sampling design

Purposive sampling.

3.8. Sample size

Sample size was calculated using the formula

$$n = 4P(1-P)/L^2$$

Where, P=30% (prevalence of UTI in preterm labour is 30% according to a study conducted by Bajwa S et al.)⁷

L=4% (absolute allowable error is 4%)

95% confidence level

Thus calculated sample size is 525.

3.9. Study variables

1. Age

2. Parity
3. Booking status
4. Address
5. Socio-economic status
6. Literacy
7. Period of gestation

8. Majority of the respondents belonged to late preterm with period of gestation from 34 to 37 weeks.
9. E-coli was the most common organism isolated in urine culture which accounted for 69% of the samples.
10. Out of the cases studied only 1.3% were complicated by pyelonephritis.

3.10. Working definition

Diagnosis of UTI was based on clinical findings of bacteriuria (bacteria in midstream urine) with bacterial colony counts of >10⁵ colony forming units (cfu)/mL along with symptoms reported by the patient.¹

3.11. Procedure

Detailed clinical history including age of patient, level of education, duration of antenatal care, parity, obstetrical history was taken.

Gestational age was calculated from menstrual history from the first day of the last menstrual period in a 28 days cycle and/or early ultrasound examination.

General examination, systemic examination and obstetric examination were done.

Investigations such as Hb, Total leucocyte count, Blood sugar, Blood grouping, HIV, Hbs ag, VDRL were carried out.

Clean catch midstream urine samples were collected from all patients in a sterile container. Two samples were thus collected: 1st sample for microscopic examination, 2nd sample for culture and sensitivity.

4. Results and Observation

A cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Trichy SRM medical college hospital, Trichy from December 2019 to June 2020 among 525 cases of preterm labour to determine the prevalence of UTI in preterm labour in relation to selected variables of interest like age, parity, socio economic class, literacy and background. Most common organism isolated was studied in addition to the number of cases complicated by pyelonephritis.

1. Out of 525 cases of preterm labour studied the prevalence of UTI in preterm labour was 30.1%.
2. Majority of respondents were between age 25-29 years which was 49.4%.
3. Most of the patients were booked as in 77.2% of cases
4. Around 91.8% were from rural background.
5. Around 75.9% belonged to the lower socio-economic class.
6. It was found in my study that UTI was more prevalent in multipara.
7. Prevalence of UTI among illiterates was as high as 92.4%.

Table 1: Urine routine examination

	Frequency	Percentage
UTI	158	30.1
Within normal limits	367	69.9
Total	525	100.0

Table 2: Educational status

	Frequency	Percentage
Illiterate	146	92.4
Literate	12	7.6
Total	158	100.0

Table 3: Background

	Frequency	Percentage
Rural	145	91.8
Urban	13	8.2
Total	158	100.0

Table 4: Socioeconomic status

	Frequency	Percentage
Lower	120	75.9
Middle	33	20.9
Upper	5	3.2
Total	158	100.0

Table 5: Parity

	Frequency	Percentage
G4	53	33.5
G3	30	19.0
G2	49	31.0
Primi	26	16.5
Total	158	100.0

5. Conclusion

The most common bacterial infection during pregnancy is urinary tract infection. Untreated UTI can be associated with obstetric complications. The prevalence of bacteriuria among the pregnant women with preterm labour was 30%. The results prove that there exists an association between gestational age, education, age and socio-economic strata

Table 6: Age distribution

	Frequency	Percentage
20 to 24	6	3.7
25 to 29	78	49.4
30 to 34	68	43
>34	6	3.8
Total	158	100.0
Mean ± SD	29 ± 3.43	

Table 7: Urine culture and sensitivity

Organism isolated	Frequency	Percentage
E -Coli	109	69.0
S.Aureus	17	10.8
Coagulase negative staph	17	10.8
Klebsiella	6	3.8
GBS	9	
Total	158	

Table 8: Period of gestation

	Frequency	Percentage
28 to 30	5	3.2
30 to 34	23	14.7
34 to 37	130	82.1
Total	158	100.0
Mean ± SD	34.64 ± 1.99	

Table 9: Booking status

	Frequency	Percentage
Booked	123	77.8
Un-Booked	35	22.2
Total	158	100.0

Table 10: Complications

	Frequency	Percentage
No Complication	156	98.7
Pyleonephritis	2	1.3
Total	158	100.0

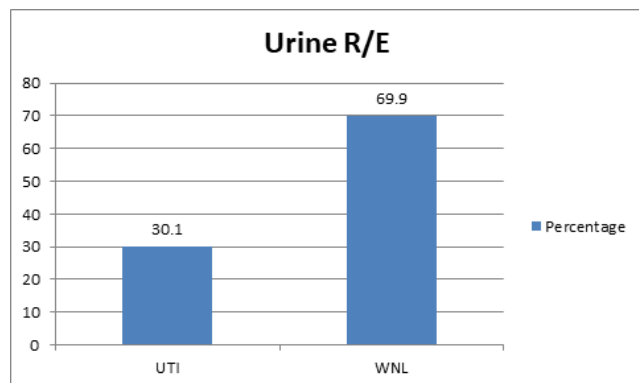


Fig. 1: Bar diagram showing respondents with UTI

Educational Status

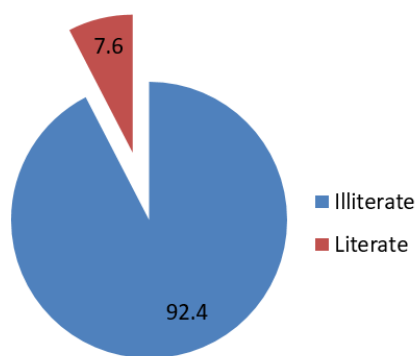


Fig. 2: Pie chart showing distribution of respondents by educational status

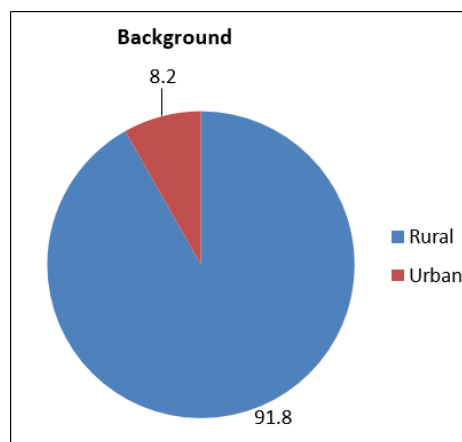


Fig. 3: Pie chart showing distribution of respondents by background

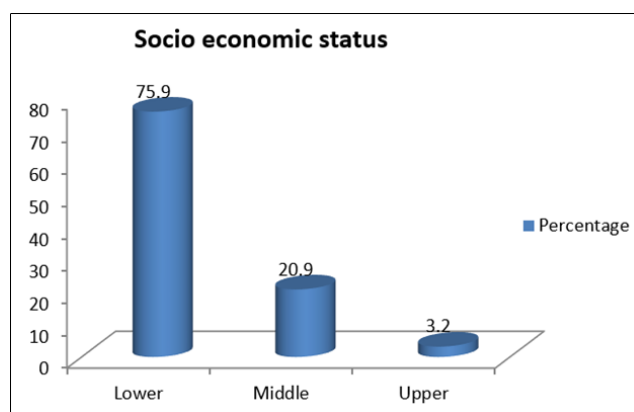


Fig. 4: Bar diagram showing distribution of respondents by socio-economic status

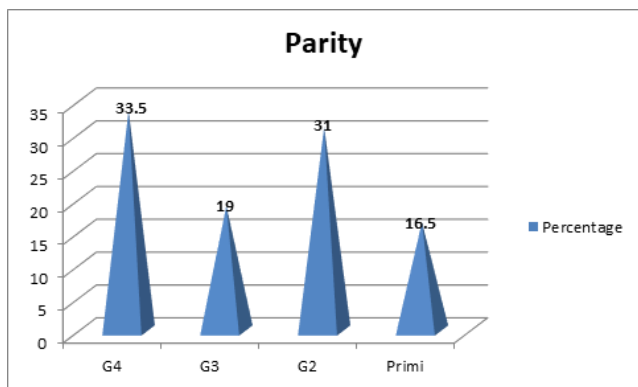


Fig. 5: Distribution of respondents by parity

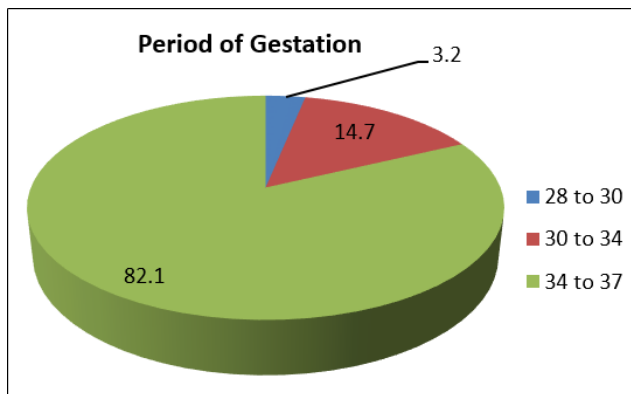


Fig. 8: Bar diagram showing distribution of respondents by booking status

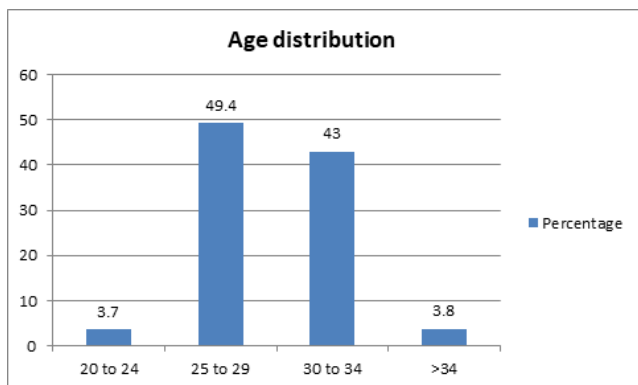


Fig. 6: Bar diagram showing age distribution of respondents

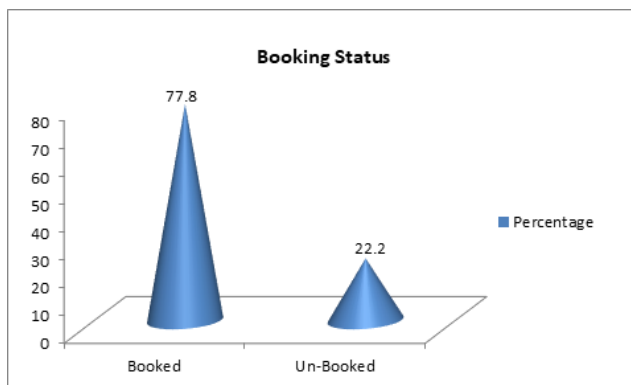


Fig. 9: Bar diagram showing distribution of respondents by booking status

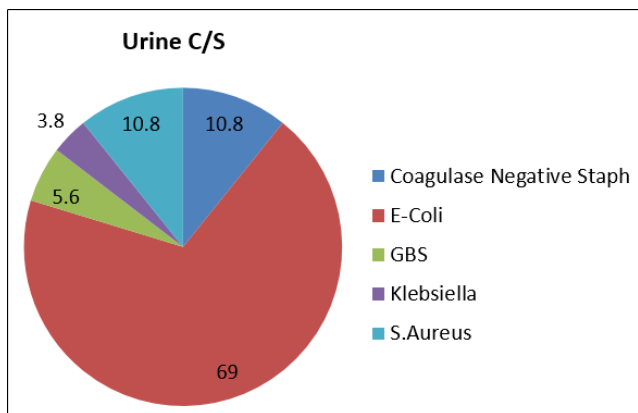


Fig. 7: Organisms isolated in urine culture and sensitivity

with bacteriuria. Hence it can be concluded that all pregnant women should be screened for UTI and treated with appropriate antibiotics if the culture is positive and then retested for cure to prevent complications. In addition, health education to all pregnant females specifically those of low socio-economic class will help in preventing urinary tract infections.

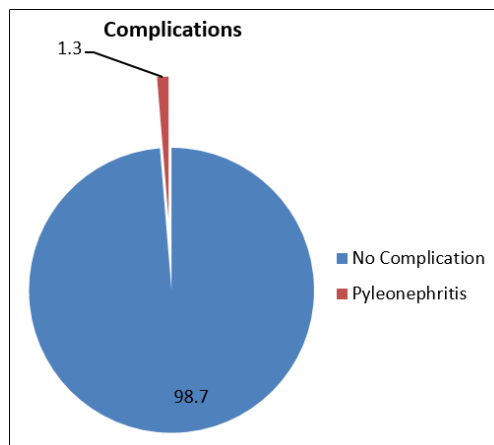


Fig. 10: Respondents with UTI complicated by pyelonephritis

6. Source of Funding

None.

7. Conflict of Interest

None.

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