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Prevalence of Urinary Tract Infection among Pregnant Women and its Maternal and Perinatal Consequences

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ABSTRACT

UTI is defined as the infection of the urinary tract. urinary tract consist of kidneys, urethra and urinary bladder .pregnant women are at greatest risk of developing UTI than men. UTI is classified into uncomplicated and complicated infection. Escherichia coli are the most predominant cause of UTIs. This study was prospective observational study conducted for 6 months in around 204 patients all the gravid pregnant women were included in the study. Pregnant women with 18-30 years were included in the study. Out of 204 pregnant women, 52% were found to be UTI positive. Prevalence of UTI was highest among age group of 24-28years and primigravida was found to be of highest prevalence due to sudden drastic hormonal and physiological changes. Out of 204 pregnant women, 32% of them had pre-eclampsia, 11% with preterm delivery, 51% with low birth weight, 6% fetal death. The fetal consequences observed are primarily due to UTI and in few of the cases, pre-eclampsia was the culprit secondary to UTI. Nitrofurantoin and cephalosporins are commonly used antibiotics. The prevalence rate of UTI during pregnancy is high so it is important to do routine screening and counselling preventive measures to all pregnant women for significant bacteriuria to reduce maternal and perinatal consequences.

1. INTRODUCTION

Pregnancy-The nine months or so for which a woman carries a developing embryo and fetus in her womb. Urine is normally sterile but can be a good growth medium for bacteria that enter the bladder and are not eliminated because of the difficulty in obtaining uncontaminated voided midstream urine specimens, quantitative thresholds have been established to distinguish bladder bacteriuria from urethral contamination.

UTI is an infection in any part of urinary system (kidneys, ureters, bladder and urethra). Women are at greater risk of developing a UTI than men are. Infection limited to the bladder can be painful and annoying however serious consequences can occur if a UTI spreads to kidney. UTI is divided into uncomplicated and complicated infection(1).

1.1 urinary tract infection in pregnancy

Pregnancy increases the risk of UTI's at around 6th week of pregnancy, due to physiological changes of pregnancy the ureters begin to dilate. This is also known as hydronephrosis of pregnancy, which peaks at 22-26 weeks and continues to persist until delivery. Both progesterone and estrogens levels increases during pregnancy and these will lead to decreased urethral and bladder tone. Increased plasma volume during pregnancy leads to decrease urine concentration and increased bladder volume. The combination of all these factors leads to urinary stasis and ureterovesical reflux. UTI's are common during pregnancy most women acquire bacteriuria before pregnancy and 20-40% of women with asymptomatic bacteriuria develop pyelonephritis during pregnancy. In pregnant women with symptoms compatible with UTI bacteriuria is considered significant if a voided or catheterized urine specimen grows > 10^3cfu/ml of a uropathogen(1).

1.1.1 Uncomplicated UTI

Table 1.1: Types of UTI [2].

CATEGORY	DESCRIPTION	CLINICAL FEATURES	LAB INVESTIGATIONS
1.	Acute uncomplicated UTI in women Acute uncomplicated cystitis in women	Dysuria, urgency, suprapubic pain No urinary symptoms in 4 weeks before this episode	WBC 10,000cells/cu mm >10,000 cfu/ml
2.	Acute uncomplicated pyelonephritis	Fever, chills, flank pain (other diagnoses)- excluded no history or clinical evidence of urological abnormalities	>10,000 WBC/cu mm >10^4 cfu/ml
3.	Asymptomatic bacteriuria	No urinary symptoms	>10,000WBC/ cu mm 10^5cfu/ml in 2 conservative MSU cultures >24 hours apart
4.	Recurrent UTI	At least 3 episodes of uncomplicated infection documented by culture in past 12 months women only; no structural/functional abnormalities	<10^3 cfu/ml

1.1.2 ASYMPTOMATIC BACTERIURIA

The term asymptomatic bacteriuria is used when a bacterial count of the same species over 10^5/ml in midstream clean specimen of urine on two occasions is detected without symptoms of urinary infection. This indicates actively multiplying bacteria within the urinary tract. E. coli is the organism in over 90% cases. Other pathogens are Klebsiella pneumonia and Proteus. To exclude pre-existent ASB, all pregnant women should ideally have a urine culture at their first antenatal visit.

a. **Incidence:** The overall incidence during pregnancy ranges between 2-10%. 25% of these women are likely to develop acute pyelonephritis, usually in third trimester, if left untreated.

The increased association of premature labor and growth retarded babies is probably related with the underlying chronic renal lesion [2,4].

1.1.3 SYMPTOMATIC BACTERIURIA

This involves upper urinary tract. It is defined as greater than or equal to 10^5 pathogens/ml.

URETHRITIS: It is the infection of urethra and most common pathogens involve Chlamydia trachomatis, Neisseria gonorrhoea, Trichomonas vaginalis.

CYSTITIS: Acute cystitis affects approximately 1% of all pregnant women. This condition is distinguished from asymptomatic bacteriuria by the presence of symptoms such as dysuria, frequency, urgency and suprapubic pain in the absence of systemic illness. 30% of women with asymptomatic bacteriuria will develop acute cystitis during their pregnancy. The only distinguished clinical finding is the presence of urethral discharge. cystitis is the infection of bladder associated with significant bacteriuria unlike ASB[5].

1.1.4 PYELONEPHRITIS IN PREGNANCY

a) **Incidence:** The overall incidence of pyelonephritis in pregnancy is between 1-3%.

b) **Etiology:**

- It is more common in primigravida than multipara.
- Previous history of urinary tract infections increases the chance by 50%.
- Presence of Asymptomatic bacteriuria increases the chance by 25%.
- Abnormality in the renal tract is found in about 25%.
- Stasis –Due to compression of the ureters by gravid uterus.

c) **Pathogenesis:** Predisposing factors-Dilatation of the ureters and renal pelvis and stasis of the urine in the bladder and the ureters are the normal physiological changes during pregnancy. The organisms responsible are E.coli (70%), Klebsiella Pneumoniae (10%), Enterobacter, Proteus, Pseudomonas and Staphylococcus aureus group. About 10% of women develop bacteremia following acute pyelonephritis. 70-80% of pyelonephritis occurs on the right side, 10-15% on the left side and only few are bilateral[3,5].

1.1.5 SYMPTOMS

- Dysuria
- Urinary urgency & frequency
- Sensation of bladder fullness or lower abdominal discomfort.
- Suprapubic tenderness
- Flank pain & costovertebral angle tenderness.
- Bloody urine.
- Fever, chills & malaise
- Vaginal discharge

1.1.6 PATHOPHYSIOLOGY

- Ascending colonization of the urinary tract results in infection by existing in vaginal, perineal & fecal flora. Various physiologic & anatomic factors predispose to ascending infection, such factors include

➢ Blood volume expansion is accompanied by increase in glomerular filtration rate & urinary output.

➢ Urinary retention caused by the weight of the enlarging uterus and urinary stasis due to enlarging uterus and urinary stasis due to progesterone-induced smooth muscle relaxation.

➢ Loss of uretral tone combined with increased urinary tract volume results in urinary stasis, which leads to dilation of the uterus, renal pelvis & calyces.

- Urinary stasis and vesicoureteral reflux predispose to upper UTI.
- This dilation starts at 10 weeks of gestation and worsens throughout the pregnancy.
- The adherence of E.coli to the urothelium results in the glycosuria and an increase in levels of urinary amino acids.

1.1.7 SCREENING

Pregnant women should be screened for bacteriuria during the first trimester.

1.1.7.1 Urine studies[7]

1. URINE CULTURE

- Indication for performing a urine culture include
- Recurrent UTI
- Pyelonephritis
- Failure to respond to initial treatment regimens
- H/O recent instrumentation

A positive urine culture is said to be one with a CFU count of 100,000 when two consecutive voided specimens were is dated from same bacterial strain.

Counts showing <100,000 CFU with 2 or more organisms indicate specimen contamination rather than infection.

➢ Aetiological agents

E. coli is the most common cause of UTI; other pathogens include Klebsiella pneumonia, Proteus mirabilis

1) Enterococcus bacteria
2) Staphylococcus saprophyticus
3) Streptococcus
4) Proteus species

Gram positive organism like enterococcus & staphylococcus can cause upper urinary tract disease. Presence of WBC casts indicate pyelonephritis.

2. URINALYSIS

- The most valuable laboratory diagnostic test for evaluation of pyuria.

- Often not indicated in women with typical symptoms of acute uncomplicated cystitis but can be helpful in cases in which the clinical presentation is not typical.

- The most accurate method for assessing pyuria is to examine an unspun voided midstream urine specimen with a hemocytometer.

- An abnormal result is > 10 leukocytes/micro ml.

- The presence of hematuria is helpful since it is common in the setting of UTI but not in urethritis or vaginitis. Hematuria is not a predictor for uncomplicated infection and does not warrant extended therapy.

Urine cultures are recommended for those with

1. Suspected acute pyelonephritis
2. Symptoms that do not resolve or recur within 2-4 weeks after the completion of treatment.
3. Those women who are present with atypical.

3. DIPSTICK TESTING: Urine dip stick testing is done to show the presence of nitrates and leukocyte esterase in evaluation of asymptomatic bacteriuria.

4. URINE CYTOLOGY: Detecting upper UTI's.

5. ANTI STREPTOMYCIN-O: Also >200 Todd units suggest streptococcal infection.

6. SULFOSALICYLIC ACIID (SSA): SSA measures urine turbidity when small amount of aspirin is added to urine specimen +2 to +4 indicates bacteriuria[7].

1.1.8 PROPHYLAXIS

Postcoital prophylaxis should be considered in pregnant women with a history of frequent UTI's before onset of pregnancy to reduce their risk of UTI.

The pregnant regimen is a single post coital drug of either cephalexin or nitrofurantoin

1.1.9 TREATMENT OF UTI[1]

Table 1.2: Treatment of UTI in pregnancy[2]

ANTIBIOTICS	DURATION OF THERAPY	COMMENTS
Nitrofurantoin 100mg	Q 12h, 3-5 days	Avoid in G6PD deficiency
Amoxicillin 500mg	Q 8h, 3-5 days	Increasing resistance
Co- amoxicillin/clavulanate	Q 12h, 3-5 days	
Cephalexin 500mg	Q 8h, 3-5 days	Increasing resistance
Fosfomycin 3g	Single dose	
Trimethoprim-sulphamethoxazole	Q 12h, 3-5 days	Avoid trimethoprim in first trimester and sulphamethoxazole in third trimester

Duration of therapy

Short cause of antimicrobial therapy should be considered for the treatment of asymptomatic bacteriuria and cystitis in pregnancy.

Follow up

Urine cultures should be obtained soon after completion of therapy for asymptomatic bacteriuria and symptomatic UTI in pregnancy.

1.1.10 TREATMENT OF PYELONEPHRITIS

✓ Patients are treated with hospitalization and IV antibiotics until the women are afebrile for 24hours and symptomatically improved.

✓ The initial choice of antibiotics should be guided by local microbiology and susceptibility data.

✓ Parenteral beta-lactams are the preferred antibiotics.

✓ Fluoroquinolones and aminoglycosides should be avoided in pregnancy[3].

1.1.10.1 EMPIRIC TREATMENT OF PYELONEPHRITIS

Table 1.3: Empiric treatment of UTI in pregnancy[3]

ANTIBIOTIC	DOSE
Mild to moderate pyelonephritis	
Ceftriaxone	1g every 24 hrs.
Cefepime	1g every 12 hrs.
Aztreonam	1g every 8-12 hrs.
Ampicillin + gentamicin	1-2g s
Severe pyelonephritis with immune compromised and/ or incomplete urinary drainage	
Ticarcillin -clavulanate	3.1g every 6 hrs
Piperacillin - tazobactam	3.375g every 6 hrs
Meropenem	500 mg every 8 hrs
Ertapenem	1g every 24 hrs
Doripenem	500 mg every 8 hrs

- Aztreonam is the alternative in the setting of beta lactam allergy.

- Aminoglycosides have been associated with fetal ototoxicity; this regimen should be used only if intolerance precludes the use of less toxic agents.

- Intravenous cefazolin or intramuscular ceftriaxone had equivalent efficacy to intravenous ampicillin plus gentamicin.

- Third generation cephalosporin is preferred over first or second generation cephalosporins, such as cefazolin for the empiric treatment of acute pyelonephritis.

- Carbapenems are usually effective in the treatment of serious extended- spectrum beta-lactamase producing strains causing infection.

Duration of therapy

As with nonpregnant patients with complicated pyelonephritis, pregnant women should have definite improvement within 24-48 hours. Once a febrile for 48 hrs, patients can be switched to oral therapy and discharged to complete 10-14 days treatment.

1.1.11 SURGICAL TREATMENT

Surgical care is rarely indicated only in cases with pathologic causes are suspected like bladder stones, cancer, urethral syndrome or bladder diverticulum.

1. Retrograde stent / percutaneous nephrostomy tube.

2. Uteroscopic stone extraction.

3. Extracorporeal shock wave lithotripsy.

Surgery during 1st trimester is associated with miscarriage and 3rd trimester is associated with preterm labor thus the operation should be planned for 2nd trimester[8].

1.1.12 PREVENTION OR BEHAVIOURAL METHODS

There is no foolproof way to prevent urinary tract infections, but there are several preventive measures that can be taken to help minimize the chance of occurrence.

- Practice good hygiene. Wipe from front to back after you urinate to prevent the spreading bacteria.
- Stay hydrated. Urinating is an effective way of clearing germs from the bladder and urethra.
- Urinate before sex and after sex. This will help eliminate genital bacteria.
- Urinate frequently, make sure to empty the bladder completely.
- Avoid caffeine and chocolate that can irritate bladder and may cause inflammation.
- Use liquid soap to prevent colonization from bar soap.
- Avoid bathtubs.
- Wash hands after using the toilet.
- Clean the genital area with washed cloth[9].

1.1.13 CONSEQUENCES

1.1.13.1 MATERNAL CONSEQUENCES

- **Preeclampsia**

The pathogenesis of preeclampsia is complex. The placenta likely causes preeclampsia with other maternal organs (e.g., kidneys) amplifying disease process. The immune response at the placental maternal interface: an imbalance in the immunologic environment can lead to placental failure. The fetal-maternal immunologic interactions at placentation involves maternal killer, immunoglobulin like receptors and fetal human leukocyte antigen molecules. This interaction fails in preeclampsia leading to an abnormal interaction among uterine natural killer cells, trophoblastic cells, and macrophage derived tumor necrosis factor alpha.

Superficial placentation with insufficient remodeling of spiral arteries and imbalance of angiogenic factors: invasive cytotrophoblasts penetrate the wall of spiral arteries, where they replace maternal endothelium, converting them to capacitance vessels capable of carrying greater blood flow through the placenta and reducing their capacity for vasoconstriction.

Factors implicated in pathogenesis of preeclampsia include placental growth factor (PIGF), vascular endothelial growth factor (VEGF-A). Oxidative stress that triggers inflammation: maternal blood enters into the intervillous space at higher blood pressure and faster rate because of the impaired arterial remodeling[6].

Classification of Preeclampsia

- **Gestational hypertension**

Presence of systolic blood pressure of 140 mm of Hg and diastolic blood pressure of 90 mm of Hg with no proteinuria.

- **Chronic hypertension**

Presence of systolic blood pressure of 140 mm of Hg and diastolic blood pressure of 90 mm of Hg before 20 weeks of gestation with new onset of proteinuria.

❖ **Preeclampsia**

Presence of systolic blood pressure of 140 mm of Hg and diastolic blood pressure of 90 mm of Hg for more than 20 weeks of gestation with proteinuria of more than 0.3g per day.

❖ **Superimposed preeclampsia**

Presence of systolic blood pressure of 140 mm of Hg and diastolic blood pressure of 90 mm of Hg for more than 20 weeks of gestation with new onset of proteinuria of 300mg per day.

Table 1.4: Classification of mild and severe preeclampsia

MILD PREECLAMPSIA	**SEVERE PREECLAMPSIA**
• Systolic blood pressure between 140 and 160 mm Hg	• Systolic blood pressure > 160 mm Hg
• Diastolic blood pressure between 90 and 110mm Hg	• Diastolic blood pressure > 110 mm Hg
• Proteinuria between 3 and 5 gm on a 24 – hour sample	• Proteinuria > 5gm on a 24- hour sample
• Urine output > 500ml / 24 hrs	• Urine output < 500ml/ 24 hrs

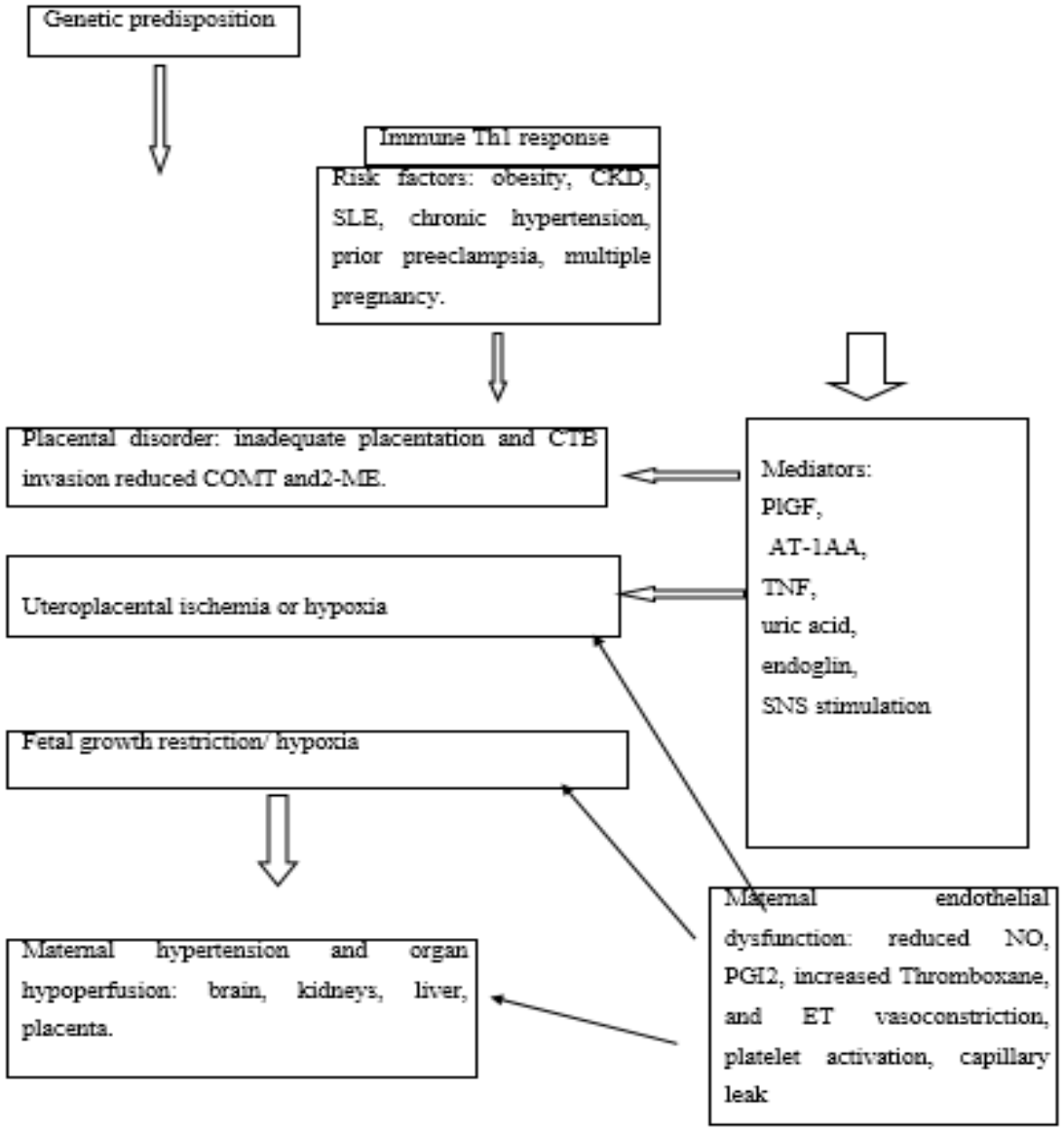

FIG 1. 1: PATHOGENESIS OF PREECLAMPSIA[6]

MANAGEMENT OF PREECLAMPSIA

The management of preeclampsia may be divided into three categories;

1) Prevention of preeclampsia

2) Early detection and treatment

Antihypertensive treatment is started when a blood pressure >160/110mmHg due to risk of stroke. Aim is to lower blood pressure to <160/105mmHg (mean arterial pressure <125mmHg).

BP may drop suddenly on commencement of treatment therefore dosage should be titrated gradually to avoid fetal distress as a result of uteroplacental circulation.

First line drug of choice is Labetalol IV infusion then give an iv bolus if required.

2nd line drug of choice is Hydralazine a direct-acting smooth muscle relaxant a bolus infusion can be given every 5 minutes.

For prevention of eclampsia magnesium sulphate (MgSO4) is drug of choice. A loading dose of 4g of MgSO4 is given followed by a maintenance infusion of 1g/hour generally 24hrs after delivery.

Antihypertensive treatment should be continued throughout assessment & labor. The only cure for preeclampsia is delivery which should be considered only when the mother has been stabilised. The criteria for delivery are bases on two factors that is gestation age at diagnosis (estimated fetal weight) and severity of preeclampsia[10].

HELLP SYNDROME: HELLP syndrome is a specific variant of severe preeclampsia HELLP is an acronym for hemolysis, elevated liver enzymes and low platelets.

Antihypertensive treatment is useful only in severe preeclampsia only to diminish risk of maternal complications like cerebral hemorrhage, eclampsia or acute pulmonary edema.

Three months post delivery screening for any renal or hypertensive disease must be suggested by physician to check for normalization of blood pressure values and urine protein disappearance[10].

Table 1.5: Treatment of preeclampsia[10].

TYPE OF HYPERTENSION	DRUG	TREATMENT REGIMEN
1)Acute	1.Hydralazine	1.5mg IV bolus every 20-30 min to maximum of 20mg, then infusion at 5-10mg/hr.
	2.Labetalol	2.50mg IV every 20min to maximum 300mg
	3.Nifedipine SR	3.20mg oral
2)Chronic a)First-line choice	Methyldopa Clonidine Oxprenolol Labetalol Atenolol	500-2000mg/day PO 0.2-0.8mg/day PO 80-480mg/day PO 200-1200mg/day PO 50-100mg/day PO
b)second-line choice	Hydralazine Prazosin Nifedipine SR	25-200mg/day PO 1-10mg/day PO 40-100mg/day PO

- **ANEMIA**

Anemia associated with pyelonephritis is due to anemia of chronic disease, termed silent renal infection. Patients with asymptomatic bacteria actually have underlying dysfunction of the renal parenchyma, which leads to the anemia. The inflammatory response created by a subclinical or silent infection may lead to decreased responsiveness of bone marrow to erythropoietin-mediated by inflammatory cytokines, specifically interleukin1 and tumor necrosis factor alpha leading to anemia.

Anemia treatment

There are several different forms of anemia, and the three most common are iron deficiency anemia, vitamin B -12 anemia and folic acid deficiency anemia.

Nonpharmacological treatment

Improvement of dietary habits- diet rich in vitamin c, proteins and iron.

Food fortification

Iron-rich foods: pulses, cereals, jaggery, beetroot

Pharmacological treatment

Prophylactic recommendation

60mg elemental iron and 0.25 mg folic acid.

Treatment of anemia depends on cause and severity

Oral iron- mild to moderate iron deficiency anemia is treated by oral supplementation with ferrous sulphate and ferrous gluconate.

Injectable iron- in case where oral iron has proven ineffective parental iron can be used. The body can absorb up to 6mg iron daily from the gastrointestinal tract.

Blood transfusions- blood transfusion are only recommended when the hemoglobin is below 70- 80 g/dl.

Erythropoiesis-stimulating agents

Hyperbaric oxygen[11]

- **CHORIOAMNIONITIS**

Chorioamnionitis is a condition that can affect pregnant women. In this condition, bacteria infects the chorion and amnion (the membranes that surround the fetus) and the amniotic fluid (in which the fetus floats). This can lead to infection in both the mother and fetus. These infections mainly start in mother's urinogenital tract[12].

Risk factors for chorioamnionitis are premature labor, rupturing of fetal membrane.

1.1.13.2 PERINATAL CONSEQUENCES

- **PRETERM DELIVERY**(less than 32 weeks of gestation)

The genitourinary infection causes the levels of PGE (prostaglandin) and tumor necrosis factor, biological fluids that normally induce labor, to increase rapidly leading to premature delivery[12].

- **LOW BIRTH WEIGHT** (2500 g or lower)

Infections during pregnancy that affect the fetus prevent adequate oxygen and nutrients to the fetus causing low birth weight[13].

- **FETAL DEATH OR NEONATAL DEATH**

The organisms that ascend from the vagina infect the uterus and then they enter the amniotic fluid either through intact choriodecidual membranes or after the membranes rupture and ultimately infect the fetus. The most common pathway of attack is by way of the fetal lung, associated with fetal breathing of contaminated amniotic fluid.

- **PRETERM+ LOW BIRTH WEIGHT** (2500g or lower and less than 32 weeks of gestation)

Urinary tract infections during pregnancy cause the release of collagenase, that induces the preterm labor and affect the fetus by preventing adequate oxygen and nutrients to the fetus[12].

3. AIMS AND OBJECTIVES

AIM

- To study prevalence of UTI among pregnant women and its maternal perinatal consequences.

OBJECTIVES

- To study the prevalence of UTI among pregnant women.
- To study the frequency of UTI occurrence in relation to age.
- To study the frequency of UTI occurrence in relation to gravid.
- To study the possible fetal complications like low birth weight, preterm labor, low birth weight+ preterm labor and fetal death.
- To study maternal complications of preeclampsia in mothers prior to the delivery.
- To study maternal-fetal complications I relation to pus cells.

4. MATERIALS AND METHODS

Study site: The present study was conducted at an inpatient department of obstetrics and gynecology in CAIMS, Karimnagar, Telangana state and inpatient department in government hospital, Karimnagar, Telangana.

Study design: This is a prospective observational study.

Study period: 6 months

Data sources referred

- Patient interview

- Patient case sheet

- Laboratory data

- Questionnaire

All the data was documented in a suitably designed data collection form developed for the study which includes.

- Laboratory data: complete urine examination, complete blood picture, 24-hour urine protein.

- Patient interview through questionnaire.

Study criteria

Exclusion criteria

- Pregnant women with comorbid condition like thyroid, anemia, diabetic patients are excluded.

- Pregnant women of gestational age 1-12 are excluded.

Inclusion criteria: pregnant women attending the hospital with

1) Pregnant women with gestational age of 13 to 36.

2) Pregnant women with pus cells above 3cells/HPF.

3) Pregnant women with UTI.

4) Pregnant women with UTI and preeclampsia

5) Pregnant women with preeclampsia

Study procedure

1. The study team visited the study sites every day on regular basis.

2. Patients meeting the inclusion and exclusion criteria were selected from the study.

3. Informed consent was obtained from each patient prior to collection of data.

4. All the relevant data was collected from the source and documented in a suitably designed data collection form.

5. The patient condition was assessed by knowing her symptoms and was noted in questionnaire form.

6. The data of the patient was collected in a data collection form.

7. The prevalence rate of UTI among pregnant women and maternal and perinatal consequences were assessed.

8. The obtained data was compiled in MS Excel sheet.

9. The data was analyzed using graph pad prism 7.0.

5. RESULTS

TABLE 5.1: PREVALENCE RATE OF UTI AMONG PREGNANT WOMEN

Prevalence	Cases	Percentage
UTI	107	52%
NON-UTI	95	47%
PRE-ECLAMPSIA	2	1%
TOTAL	204	100%

Table 5.1: shows prevalence of UTI among pregnant women. Out of 204 pregnant women, UTI was found in 52%, non-UTI was found in 47% and 1% in preeclampsia.

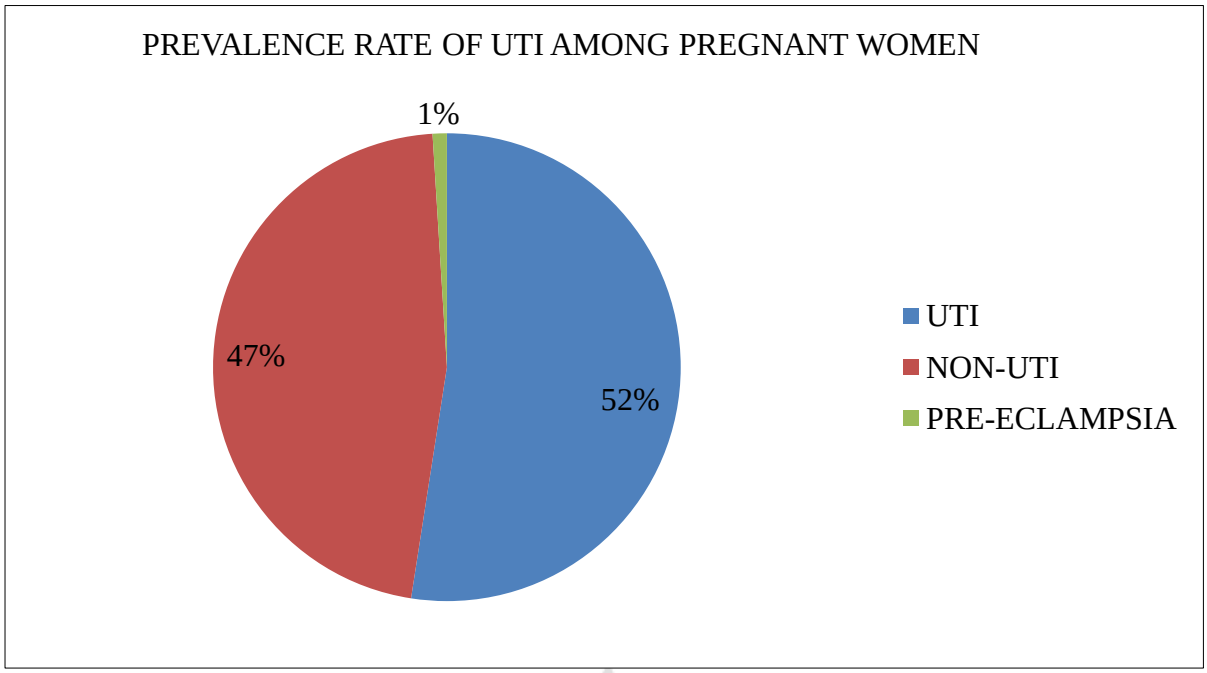

FIG 5.1: Prevalence rate of UTI among pregnant women

TABLE 5.2: PREVALENCE OF UTI AMONG PREGNANT WOMEN IN RELATION TO AGE

AGE	TOTAL CASES	PERCENTAGE
19-23 YRS	73	36%
24-28 YRS	95	46%
29-33 YRS	36	18%
TOTAL	204	100%

Table 5.2: shows prevalence of UTI in pregnant women in relation to age. Highest incidence of UTI was Seen in pregnant women of age group 24-28 years and lowest incidence was found in age group of 29-33 years. Mean age was found to be 25.03, standard deviation was found to be 3.316.

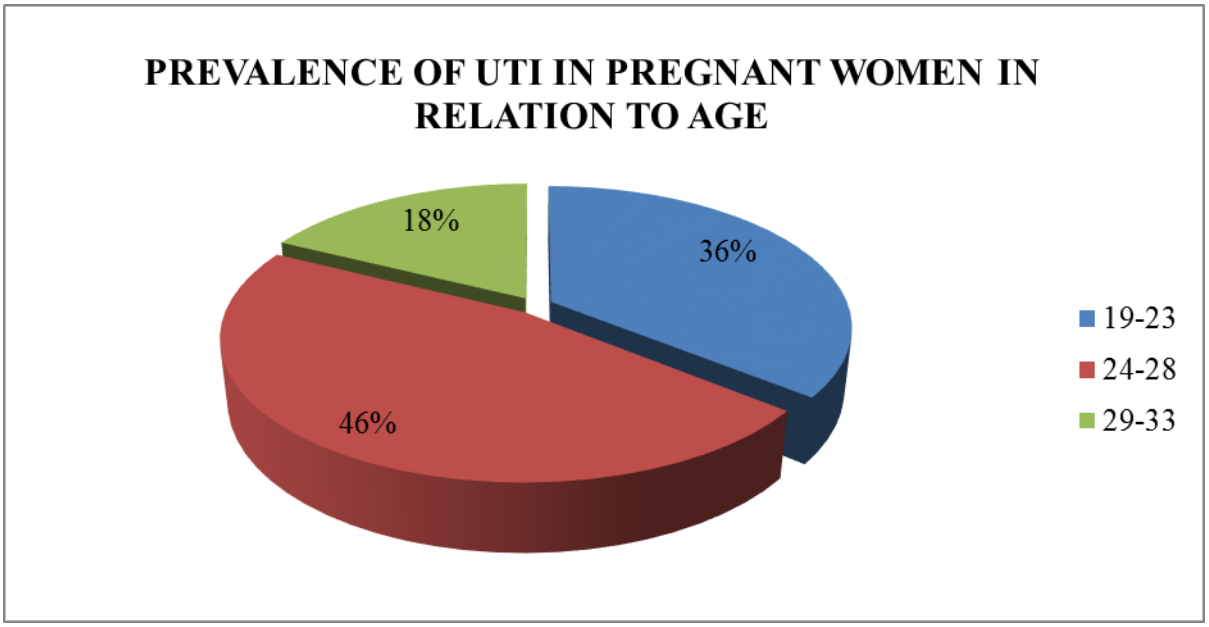

FIG 5.2: Prevalence of UTI among pregnant women in relation to age

TABLE 5.3: PREVALENCE OF UTI IN PREGNANT WOMEN IN RELATION TO GRAVID

GRAVID	NO OF CASES EXAMINED	NO OF POSITIVE CASES	PERCENTAGE
PRIMI	55	47	50%
SECOND	39	41	36%
MULTI	15	7	14%
TOTAL	109	95	100%

Table 3: shows prevalence of UTI in pregnant women in relation to Gravid. Highest incidence was seen in primigravid i.e. 50 % and lowest incidence was seen in multigravida i.e. 14% and in second gravid 36 % incidence was observed. P- value was found to be 0.7576 which is not statistically significant.

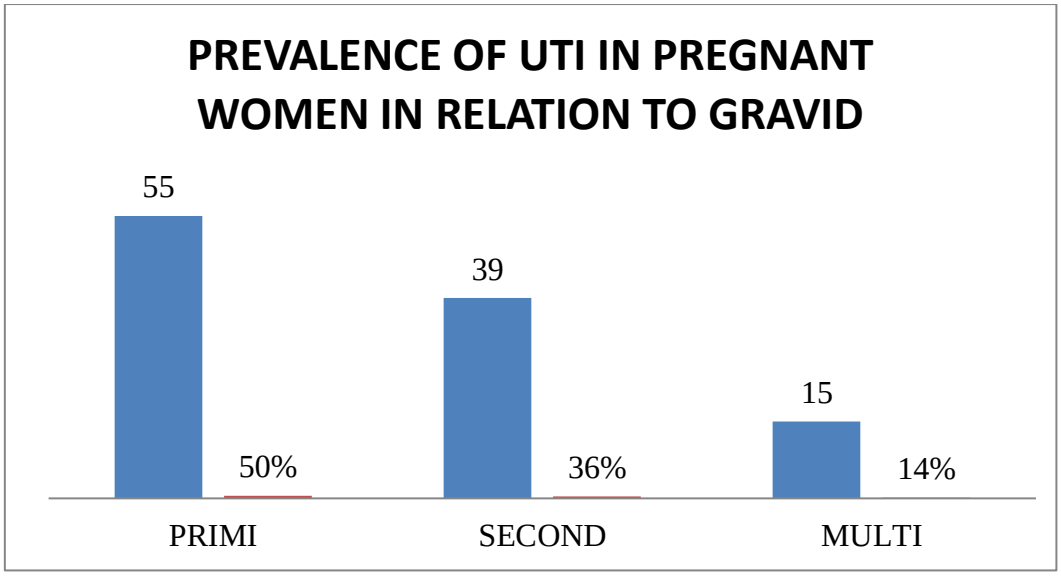

FIG 5.3: Prevalence of UTI in pregnant women in relation to gravid

TABLE 5.4: PREVALENCE OF UTI AMONG PREGNANT WOMEN IN RELATION TO PUS CELLS

PUS CELLS	NO OF CASES	PERCENTAGE
0-5	38	35%
6-10	59	54%
>10	7	6%
PLENTY	5	5%
TOTAL	109	100%

Table 5. 4: shows prevalence of UTI in pregnant women in relation to pus cells. 35% cases were found to in 0-5 pus cells/HPF, 54% cases were seen in 6-10 pus cells/HPF, 6% cases were seen in >10 pus cells/HPF and 5% cases were found in plenty pus cells/HPF.

TABLE 5.5: FREQUENCY OF CONSEQUENCES IN UTI CASES

CONSEQUENCE	NO OF CASES
PRE-ECLAMPSIA	38
PRETERM BIRTH	14
LOW BIRTH WEIGHT	61
FETAL DEATH	7

Table 5.5: shows frequency of consequences in UTI positive cases, result shows preeclampsia cases were found to be 38, preterm deliveries were seen in 14 cases, low birth weight was seen in 61 cases and fetal death was seen in 7 cases.

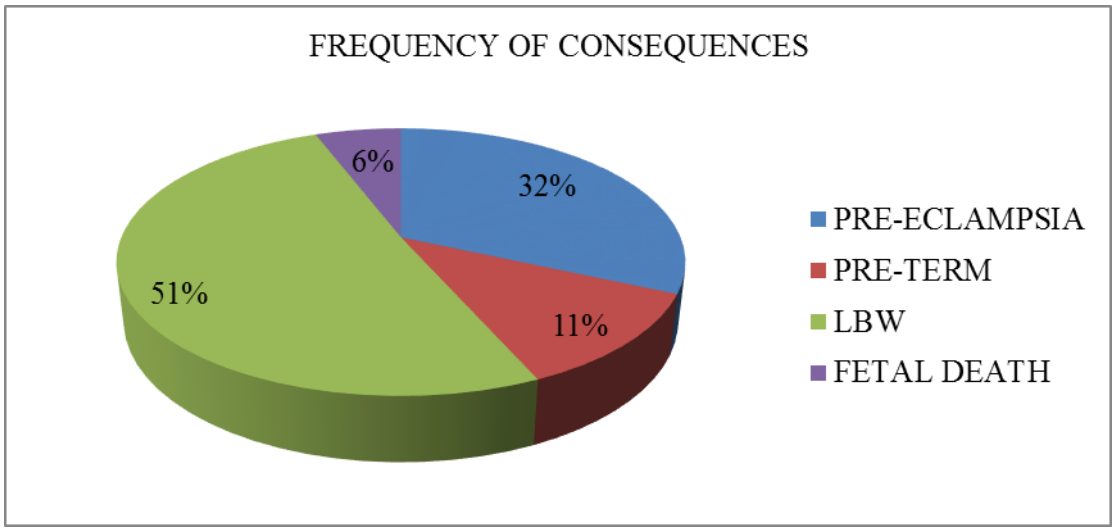

FIG 5.4: Frequency of consequences

TABLE 5.6: PREVALENCE OF UTI AMONG PREGNANT WOMEN WITH PUS CELLS IN RELATION TO PREECLAMPSIA

PUS CELLS	NO.EXAMINED	NO. POSITIVE	PERCENTAGE
0-5	38	18	47%
6-10	59	18	47%
>10	7	1	3%
PLENTY	5	1	3%
TOTAL	109	38	100%

chi-square value is 1.181, p-value is 0.375 p-value (<0.05) is not significant.

Table 5.6: shows prevalence of UTI among pregnant women with pus cells in relation to preeclampsia, highest incidence was seen in 0-5 pus cells/HPF, lowest incidence was seen in plenty -pus cells/HPF. Chi-square value is 1.181, at P-value 0.375 which is statistically not significant.

TABLE 5.7: PREVALENCE OF UTI AMONG PREGNANT WOMEN WITH PUS CELLS IN RELATION TO LOW BIRTH WEIGHT

PUS CELLS	NO.EXAMINED	NO. POSITIVE	PERCENTAGE
0-5	38	20	33%
6-10	59	36	59%
>10	7	4	6%
PLENTY	5	1	1%
TOTAL	109	61	100%

chi-square value is 3.107, p-value is 0.3754 (<0.05) is statistically not significant.

Table 5.7: shows prevalence of UTI among pregnant women with pus cells in relation to low birth weight, highest incidence was seen in 6-10 pus cells/HPF, lowest rate was seen in plenty pus cells/HPF.

TABLE 5.8: PREVALENCE OF UTI AMONG PREGNANT WOMEN WITH PUS CELLS IN RELATION TO PRE-TERM

PUS CELLS	NO.EXAMINED	NO. POSITIVE	PERCENTAGE
0-5	38	8	57%
6-10	59	5	36%
>10	7	1	7%
PLENTY	5	0	0%
TOTAL	109	14	100%

chi-square value is 3.107, p-value 0.3754 (<0.05) is statistically not significant.

Table 5.8: shows prevalence of UTI among pregnant women with pus cells in relation to preterm delivery, highest incidence was seen in 0-5 pus cells/HPF, i.e., 57%, lowest rate was seen in plenty pus cells/HPF i.e., 0%.

TABLE 5.9: PREVALENCE OF UTI AMONG PREGNANT WOMEN WITH PUS CELLS IN RELATION TO FETAL DEATH

PUS CELLS	NO.EXAMINED	NO. POSITIVE	PERCENTAGE
0-5	38	4	57%
6-10	59	2	29%
>10	7	1	14%
PLENTY	5	0	0%
TOTAL	109	7	100%

chi-square value is 2.63, p-value 0.4523 (<0.05) is statistically not significant.

Table 5.9: shows prevalence of UTI among pregnant women with pus cells in relation to fetal death, highest incidence was seen in 0-5 pus cells/HPF i.e., 57%, lowest rate was seen in plenty pus cells/HPF i.e., 0%.

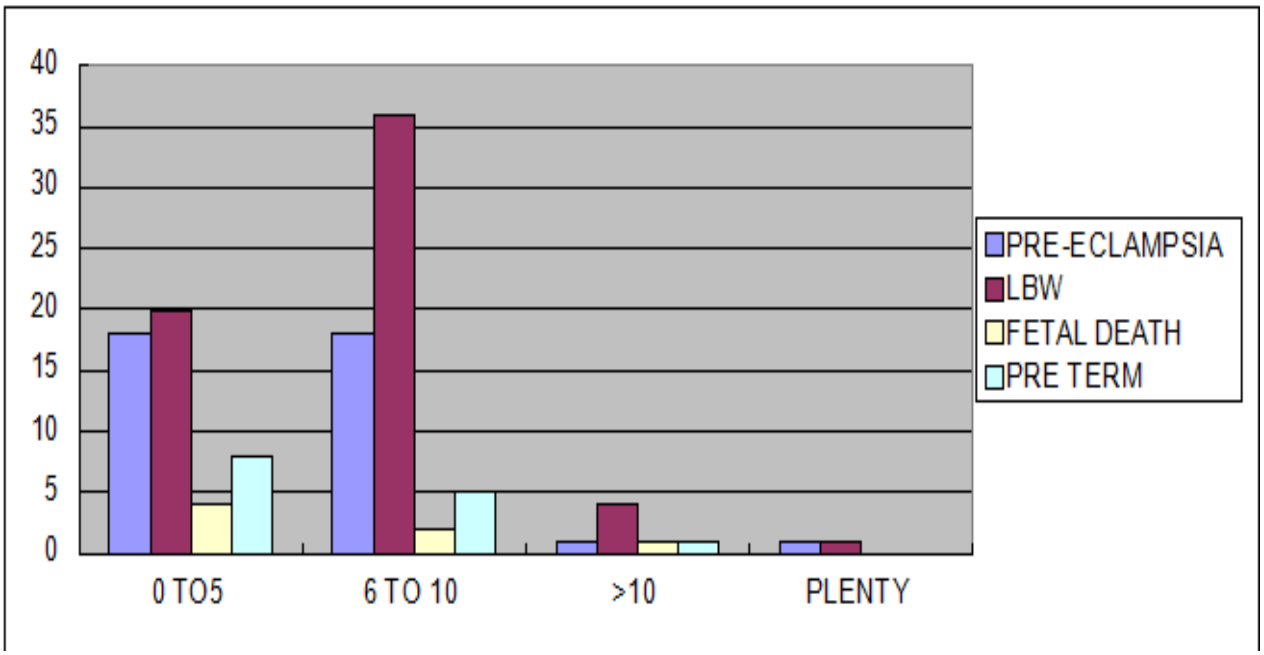

FIG 5.5: **Prevalence of UTI among pregnant women with pus cells in relation to fetal death**

TABLE 5.10: FREQUENCY OF FETAL CONSEQUENCES DUE TO UTI

CONSEQUENCE	NO. EXAMINED	NO.POSITIVE	PERCENTAGE
DEATH	7	2	5%
PRE TERM	14	5	11%
LBW	61	37	85%
TOTAL	82	44	100%

Table 5. 10: shows frequency of fetal consequences due to UTI among pregnant women, fetal deaths due to UTI was found to be 5%, preterm labor was found to be 11%, low birth weight was found to be 85%.

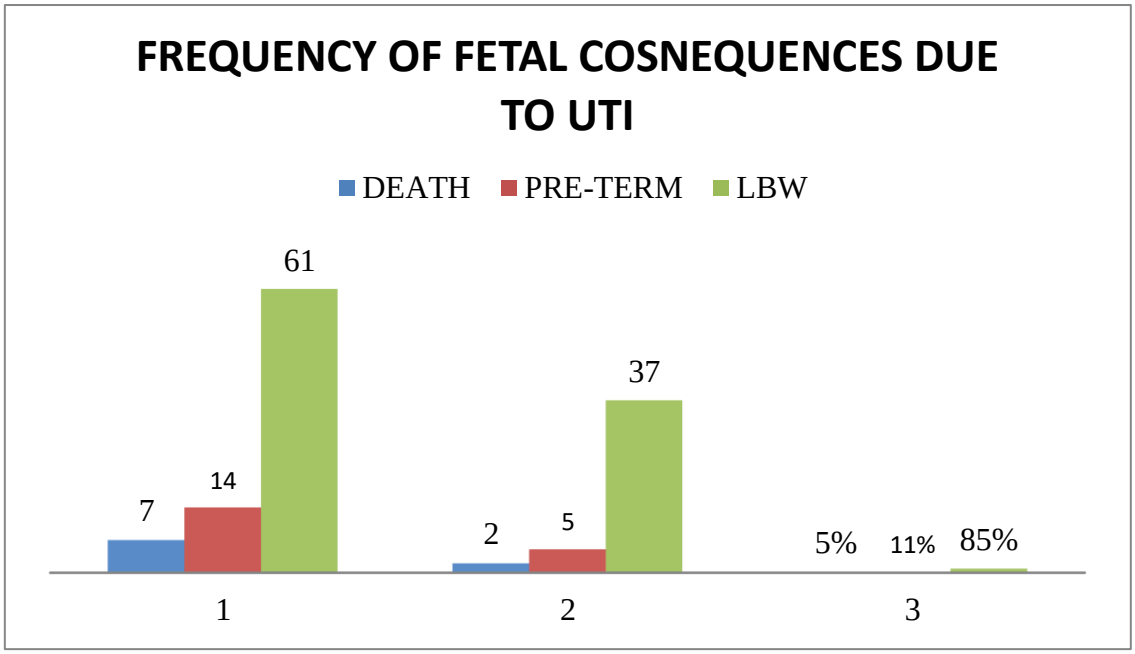

FIG. 5.6 FREQUENCY OF FETAL CONSEQUENCES DUE TO UTI

TABLE 5. 11: FREQUENCY OF FETAL CONSEQUENCES DUE TO PRE-ECLAMPSIA SECONDARY TO UTI

CONSEQUENCES	NO. EXAMINED	NO. POSITIVE	PERCENTAGE
DEATH	7	5	13%
PRE- TERM	14	9	24%
LBW	61	24	63%
TOTAL	82	38	100%

Table 5. 11: shows frequency of fetal consequences due to preeclampsia secondary to UTI among pregnant women, fetal deaths due to preeclampsia with UTI was found to be 13%, preterm labor was found to be 24%, low birth weight was found to be 63%.

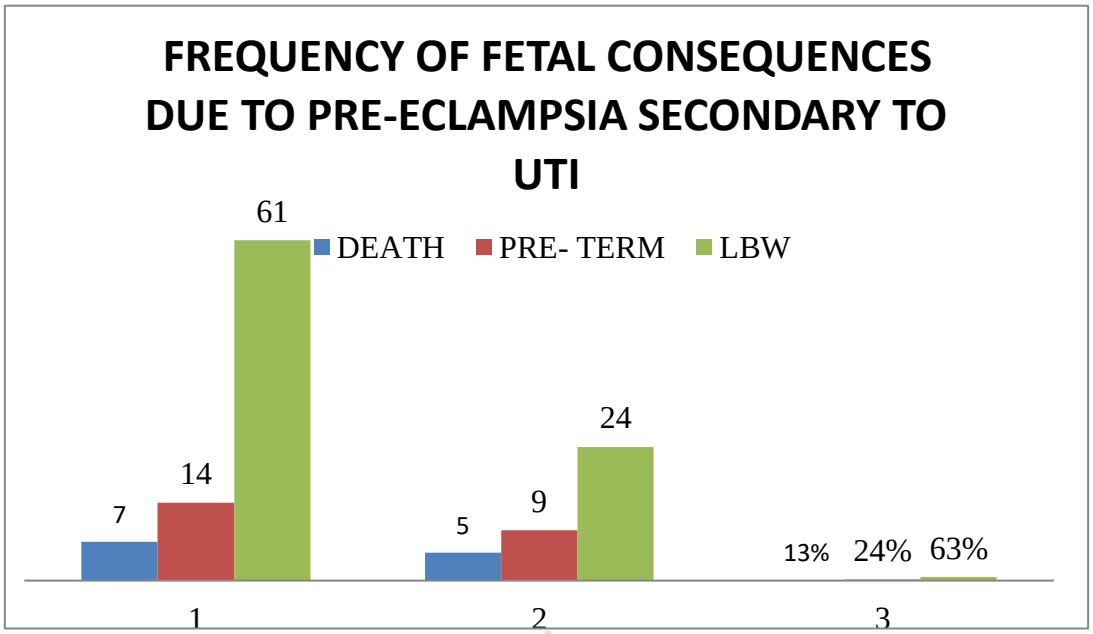

FIG. 5.7 FREQUENCY OF FETAL CONSEQUENCES DUE TO PRE-ECLAMPSIA SECONDARY TO UTI

6. DISCUSSION

In this present study total number of 204 cases were collected, of which 107 i.e., 52% were UTI positive and 95 cases i.e., 47% are UTI negative, 2 are with preeclampsia. Hence, the prevalence rate of UTI among pregnant women in this study was found to be 52% which indicates the prevalence rate is very high.

Among these 204 cases, 95 cases were excluded because of non-UTI and 109 UTI positive cases were followed up and complications were observed in 82 pregnant women after delivery.

In this study, prevalence rate of UTI in pregnant women in relation to age was highest in people with age group of 24-28 years [46%]. Our results were nearly comparable to Dr. *Parveen et al*, studies which states highest rate of infection seen in age group of 21-25 years.

UTI in pregnant women in relation to gravid was highest in people with primi gravida[50%] and lowest prevalence rate was seen in people with multi gravida[14%], our results were not comparable to Dr. *Kawser Parveen et al*, studies, It states that highest prevalence of UTI in

relation to gravid was seen in those having multiple pregnancies and lowest prevalence of infection occurred in those with first pregnancy.

Present study showed 0-5 pus cells/HPF in 35% cases, 6-10 pus cells/HPF in 54% cases, 10 pus cells/HPF in 6% cases, plenty pus cells/HPF in 5% cases.

According *Amiri et al.*, UTI in mothers is the major reason for low birth weight in infants, the results of present study show 33% LBW cases were found in 0-5 pus cells/HPF, 59% LBW cases were found in 6-10 pus cells/HPF, 6% cases were found in >10 pus cells/HPF, 2% cases were found in plenty pus cells/HPF. Chi-square is applied and P value is 0.375 results were not significant at P value 0.3754 (<0.05). This may be due to small sample size.

In this study, 38 cases were observed with 0-5 pus cells/HPF, among those 18 cases were with preeclampsia with percentage of 47% and 59cases were seen in 6-10 pus cells/HPF, 7 cases were observed with >10 pus cells/HPF, among those 1 case was with preeclampsia with percentage of 3% and 5 cases were observed with plenty pus cells/HPF, among those 1 case was with preeclampsia with percentage of 3%. There were no relevant studies showing correlation between pus cells and consequences.

In our study, fetal deaths were observed. Among 0-5 pus cells/HPF **4** fetal death cases were observed with percentage of 57%. In 6-10 pus cells/HPF 2 cases were found with percentage of 29%. In > 10pus cells/HPF 1 case was found with 14%. Results were not significant at P value 0.05.

According to *Farah Iqbal et. al.*, there is significant association between the preterm labor and UTI in pregnant women. It includes several theories such as uterine concentrations induced by cytokines and prostaglandins which are released by microorganisms. In our study 14 preterm labor cases were observed., among those 57% cases fell in 0-5 pus cells/HPF, 36% cases in 6-10 pus cells/HPF, 7% cases were observed in >10 pus cells/HPF. Results were not significant at P value 0.05.

In this study frequency of fetal consequences due to UTI i.e., preterm birth, low birth weight along with fetal death were observed, where 85% were found to be low birth weight and 11% were found to have preterm birth and 5% were found to be fetal death. According to *Amiri M et al.*, correlation exists between UTI in pregnant women and complications in their newborn.

Along with the above condition frequency of fetal consequences due to preeclampsia secondary to UTI were studied. Among the 82 UTI positive cases, 63% were found to have low birth weight and 24% with preterm birth and 13% were found to be fetal death. According to Negin rezavind et al., there was significant association between asymptomatic bacteriuria and preeclampsia but there were no reviews showing fetal consequences caused by preeclampsia which is secondary` to UTI.

7. CONCLUSION

Urinary tract infections are the second most prevailing diseases during pregnancy after Anemia The prevalence rate of urinary tract infection during pregnancy is very high [52%]. Therefore, all pregnant women should be screened for presence of UTI in their first weeks of gestation to reduce the complications on maternal and fetal health. Primigravid women are found to be more prone to UTI [50%] due to sudden and drastic hormonal and physiological changes during first pregnancy. In this study, the chance of UTI was higher among the pregnant women with age group of 24-28 year. Highest incidence of low birth weight was most prominently observed. Antibiotics commonly used for this condition are Nitrofurantoin and Cephalosporins. These antibiotics have not been found to be associated with increased risk of birth defects when used during pregnancy. In most of the cases, UTI was not treated during early stages. UTI during pregnancy can lead to serious consequences if left untreated. Therefore proper screening during antenatal visits plays an important role in management of urinary tract infections. Preventive measures are to be counseled during the antenatal visits to prevent any further maternal and fetal consequences like preeclampsia, low birth weight and preterm labor.

8. LIMITATIONS

Small sample size

Short study period makes it hard in following up pregnant women after delivery

Limitations in diagnosis as there was no culture sensitivity test done

Variation in prescribing pattern.

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9. REFERENCES

1. A Medical letter on drugs and therapeutics, Drugs for UTI. JAMA, 2014;311: 87
2. Grebe M, Bjerklund-Johansen TE, Botto H, et al., Guidelines on urological infections. Arnhem, The Netherlands: European Association of Urology (EAU); 2011 Mar.
3. Thomas M Hooton, MD. Acute complicated cystitis and pyelonephritis. May 30, 2014.
4. DR. Loh k, Sivilingam N. Urinary tract infections in pregnancy. Malays fam physician 2007; 2(2): 54-57.
5. MC Cornick T, Ashe RG, Kearney PM. UTI in pregnancy. The obstetrician and gynaecologist (2008):10:156-152.
6. Johnson RJ, Feehally J. Comprehensive clinical nephrology. UTI in pregnancy. Amsterdam: Elsevier publication; 2014.p.511-512.
7. [Guideline] Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infec Dis.*2005 Mar 1.40(5): 643-54.
8. Transl Androl Urol. 2017 jul; 6(Suppl 2): S153-S162.
9. Fasalu Rahiman OM, Bala Subramanian T, Shejina M, Mohthash Musambil. A review of urinary tract infection in pregnancy. International journal of pharmacy research & review, Feb 2015; 4(2):26-33.
10. Fried A English, Lousie C Kenny, Fergus P McCarthy. Risk factors and effective management of preeclampsia. Dove Express. March 2015: 8: 7-12.
11. https://doi.org/10.1182/blood-2016-08-672246.
12. Farah Iqbal, Kaniz Zehra Naqvi, Sana Ashfaq, Erum Memomsafia Aziz, Sadia Sultan, Syeda Mohammed Irfan. Association of maternal UTI with adverse fetal outcome in terms of preterm labor and low birth weights. J. SOC. Obstet. Gynecol. Pak. 2017; 7(1): 33-37.
13. Schultz R, Read AW, Straton JA, Stanley FJ, Morieh P. Genitourinary tract infections in pregnancy and low birth weight: case control study in Australian aboriginal women. BMJ. 1991; 303(6814):1369- 1372.
14. Amiri M et al., Prevalence of urinary tract infections among pregnant women and its complications in their newborns during the birth in the hospitals of Dezful city, Iran,2012-2013.Iran Red Cresent Med J,2015:17(8):1-8.
15. A.K.Onifidae, F.O. Omoya, D.V. Adagunloye. Incidence and control of urinary tract infections among pregnant women attending antenatal clinics in government hospitals in Ondo state, Nigerian journal of food, Agriculture and environment 2005 vol 3(1):37-38.
16. Manjula N.G., Giris C.Math., shripad A. Patil, Subhash Chandra M. Gaddad, Channappa T. Shivannavar. Incidence of urinary tract infection and its Aetiological Agents among pregnant women in Karnataka Region. Advances in Microbiology 201; 3(6): 473- 478.
17. Marcelo Vianna Vettore, Macrus Dias, Mario docarmoleal. Assessment of urinary tract infection management during perinatal care in Pregnant women attending public health care units in the city of Rio deJaneiro, Brazil.
18. Ajide Bukolo, Adoga Lilian, Saida Henrietta, Enna Maurean. Prevalence of urinary tract infection among pregnant women receiving Antenatal care in primary health care centres in Karu Nasarwa state, Nigeria. British Microbiology Research Journal 2016; 12(3): 1-8
19. Dr. Kawser Praveen, Dr. Afrosa Momen, Dr. Arzumath Ara Begum. Prevalence of UTI during pregnancy J. Dhaka national Med. Coll,. Hos. 2011; 17(02): 8- 12.
20. Easter SR, Cantonwine DE, Zera CA, Lim KH, Parry SI, McElrath TF. Urinary tract infection during Pregnancy, Angiogenic Factor Profiles, and risk of Preeclampsia. Am J Obstet Gynecol. March 2016; 214(3) 387 e 1- 7.
21. Lessandra Michelium, Guilherme Rasia Bosi, Eduardo Compars. Urinary Tract Infection in Pregnancy: Review of clinical management. Journal of clinical Nephrology and Research 2016; 3(1): 1030.

22. Minassian C, Thomas SL, Williams DJ, Campbell O, Smeeth L. Acute maternal infection and risk of preeclampsia: A Population-Based Case Control Study. PLoS ONE 8(9): e73047.
23. Negin Rezavind , firooze veisi, mrayam zangine , roghaye amini , Afshin Almasi. Association between asymptomatic bacteriuria and preecampsia. Glob J. Health Sci. 2016 Jul; 8(7):235-239.
24. Lorie f.cram, MD. Maria-Isabel Zapata, MD. Eugene C.Toy, MD,& Benton baker 111,MD.christus. genitourinary infections and there association with preterm labor. American family physician Jan 15 2002; 65(2) 241-247.
25. Anil. K. Kaul , Shah Khan, Mark G. Martens, John T. Crosson, Virgina R . Lupu and Rashmi Kaul . Experimental gestational pylonephritis induced preterm birth and low birth weight.
26. Schnarr J, Smaill F. Asymptomatic bacteriuria and symptomatic urinary tract infection in pregnancy Eur J Clin Invest (2008); 38(2):50-57.
27. Dr. Gyan Prakash Tandi, Dr. Rajkumar Rathore, Dr. Kiran Nain, Dr. Omi chouhan, Dr. Attendra Singh, Dr.Milati Dua. To study the prescription pattern of antimicrobials in urinary tract infection in pregnant women in a tertiary care hospital. Scholar academic journal of pharmacy/sch. Acad.J. Pharm, 2016; 5(3): 71-75.
28. Anatte Karmon, Eyal Shiener. The relationship between urinary tract infection during pregnancy and pre-eclampsia: causal, confounded or spurious? Archives' of gynecology and obstetrics 2008, 277(6), 479-481.
29. Denise pong, MPH and Leah Bressler, MP, MPH.UTI associated with increased risk of preeclampsia 2015.
30. LA schieve, A handler, R Hershow, V. Persky, R. Davis. UTI during pregnancy and its association with maternal morbidity and perinatal outcomes. AMJ public health. Mar 1994: 84(3): 405-410.