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## Cross-Sectional Study of the Prescription Patterns on Urinary Tract Infection in Pregnant and Non-Pregnant Women in Tertiary Care Hospital



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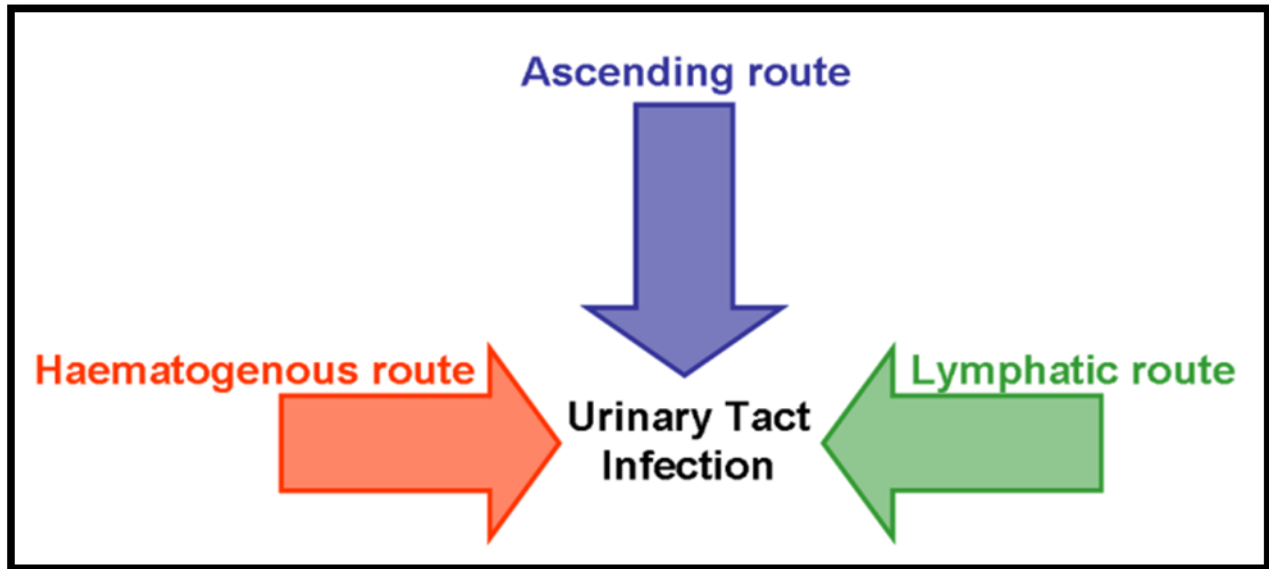
### ABSTRACT

**Background:** Urinary Tract Infection (UTI) is defined as significant bacteriuria in the presence of symptoms. UTI is the most common bacterial infection, accounting for 25 % of all infections. Urinary Tract Infection (UTI) is a common and serious health problem affecting many people each year around the world especially females. In pregnant women, hormones cause changes in the urinary tract, which predisposes women to infections. **Objective:** To study the prescription pattern of urinary tract infection in pregnant and in non-pregnant women's. Early diagnosis and proper treatment can reduce the risk of complications. Create awareness of developing UTI and to prevent reoccurrence by patient counseling. **Method:** An observational, cross-sectional, prospective and descriptive; and was carried out in both in-patients and out-patients. The study was conducted in Narayana Hrudayala-Malla Reddy hospital in the study period between July 2013-July 2016 (36 months). Seven hundred and ninety -four patient (n=794), were enrolled in the study. **Result:** Treatment of choice in pregnant were restricted to only a few prescriptions like Cefalexin, Amoxicillin, Nitrofurantoin, Cefepime, Piperacillin +Tazobactam as they are safe in pregnancy. Wide variety of treatment of choice in the women who were not pregnant were administered based on the organism detected in the mid-stream urine sample and the prescriptions used were Ciprofloxacin IV, Ciprofloxacin Oral, Cephalexin, Amoxicillin+clavulanic acid, Amoxicillin, Nitrofurantoin, Ampicillin, Vancomycin, TMP-SMX (Co-trimoxazole) and Fluconazole (treatment of yeast infection). And the patients who were breastfeeding were prescribed with Cephalexin, Amoxicillin, Amoxicillin+clavulanic as it doesn't enter breast milk. **Conclusion:** Study concludes that Cephalexin was highly prescribed in pregnant women's both in in-patient and out-patients. Whereas in the patients who were not pregnant were prescribed with ciprofloxacin and cephalixin in the in-patients cases; and Amoxicillin+Clavulanic acid (Augmentin) was prescribed to a maximum number of the patients in the out-patient department.

## 1. INTRODUCTION

Urinary tract infection (UTI) is an infection caused by the presence and growth of micro-organism anywhere in the urinary tract; and is perhaps the single common bacterial infection of mankind (By Morgan & Mckenzie, 1993, *et al.*) from the body which includes urethritis, cystitis, urethritis, and pyelonephritis. UTI's are among the most common bacterial infections in humans, both in the community and hospital settings and have been reported in all age groups in both sexes (By Hooton *et al.*, 1995). UTI are most commonly encountered infectious disease by clinicians in developing countries with an estimated annual global incidence of at least in 250 million of the population. UTI affects all age groups, but women's are more susceptible than men, due to the short urethra, an absence of prostatic secretions, pregnancy & easy contamination of urinary tract with fecal flora<sup>[2]</sup>. UTI can be classified into lower urinary tract infection involving the bladder and urethra and upper urinary tract infection involving the kidney, pelvis, and ureter. The majority of the UTI occur due to ascending infection<sup>[3]</sup>. Three common clinical manifestations of UTIs in pregnancy are asymptomatic bacteriuria, acute cystitis and acute pyelonephritis<sup>[4]</sup>. "Asymptomatic bacteriuria" is a term coined by Kass, which indicates multiplication of organisms within the urinary bladder without the realization of the patient<sup>[5]</sup>. Untreated bacteriuria in pregnancy either asymptomatic or symptomatic is associated with a 50% increase in the risk of low birth weight babies; there is a significant increase in the risk of premature delivery, preeclampsia, hypertension, anemia and postpartum endometritis<sup>[6]</sup>. Pregnant women are more susceptible to UTI due to a number of factors including ureteral dilation, increased bladder volume and decreased bladder tone, along with decreased ureteral tone which contributes to increased urinary stasis and ureter vesicle reflux. Development of glycosuria seen in 70% of pregnant women encourages bacterial growth in the urine. Pregnancy causes numerous changes in the women's body. A hormonal and mechanical change increases the risk of urinary stasis and vesicoureteral reflux. These changes, along with an already short urethra (3-4 cm) and difficulty with hygiene due to a distended pregnant belly, increase the frequency of UTI in pregnant women. Indeed UTI's are among the most common bacterial infections during pregnancy. In general, pregnant patients have considered immune compromised UTI hosts because of the physiological changes associated with pregnancy. This change increases the risk of serious infectious complications from symptomatic and

asymptomatic urinary infections even in healthy pregnant women. Anus and the urethra are so close together in women and it makes contamination lot more likely, and the urethra is lot shorter compared to men hence, bacterial has a much shorter climb on their way to the bladder, also contributing to the factor that UTI are common in women. 80% of UTI are caused by *E.coli* because of pilli like structure which helps them to climb up and sticks to the urinary bladder and prevents from being washed away compared to other bacteria.



## 2. MATERIALS AND METHODS

### 2.1 Study design, Setting and Study population

The present study was observational, cross-sectional, prospective and descriptive; and was carried out in both in-patients and out-patients. The study was conducted in Narayana Hrudayala-Malla Reddy hospital in the study period between July 2013-July 2016 (36 months). Seven hundred and ninety-four patients (n=794), were enrolled in the study.

**Inclusion criteria:** Female patients, UTI, both in and out patients, pregnancy and non-pregnant.

**Exclusion criteria:** Male Patients, Females below 18 years.

## 2.2 Data collection

Medical case sheets, drug charts, and their laboratory investigations were recorded in self-designed standardized performa and were analyzed. Demographics (Age, Sex), Chief complaints, Current diagnosis, medical history, medication prescribed (dose, route of administration, frequency, indication, therapy duration, marketing categories [generic/branded]) surgical procedures performed were collected.

## 2.4 Ethical considerations

The study was conducted only after obtaining approval from institutional research and ethics committee.

## 2.5 Statistical analysis

An observational study was done to view and record the data, prospective study was done to check the outcome and descriptive statistics were applied to the study to collect the data using Microsoft excel software; and the results were applied in percentage.

## 3. Scope of the study:

- a) To study the prescription pattern of urinary tract infection in pregnant and in non-pregnant women's.
- b) Comparison between the treatments of choice in pregnancy compared to others.
- c) Early diagnosis and proper treatment can reduce the risk of complication.
- d) Create awareness of developing UTI and to prevent reoccurrence by patient counseling.

## 4. RESULTS

**Table no: 1 Age group distribution**

Age	No. of Patients	Percentage
18-35	497	63%
36-55	216	27%
>55	81	10%

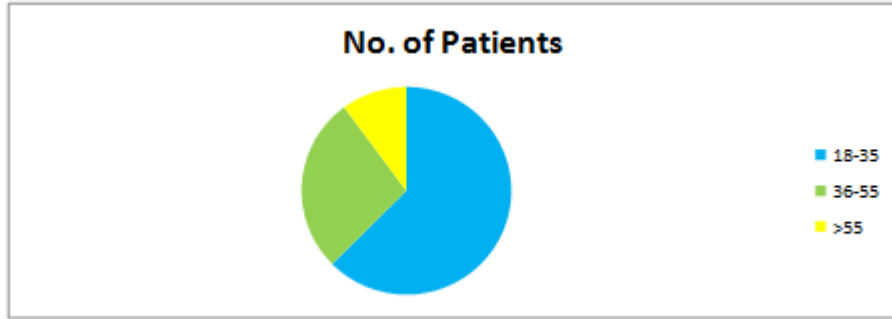


Fig no: 1

Table no: 2 Out-patients and In-patients

	No. of patients(n=794)	Percentage
Out-patients	533	67%
In-patients	261	33%

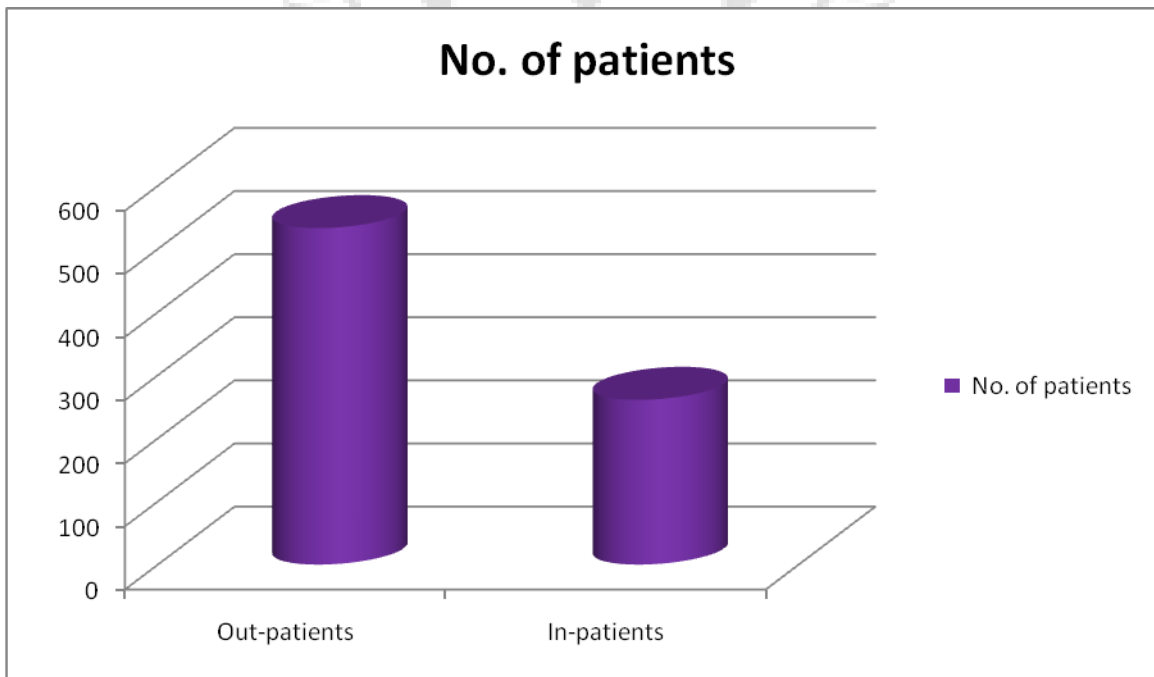
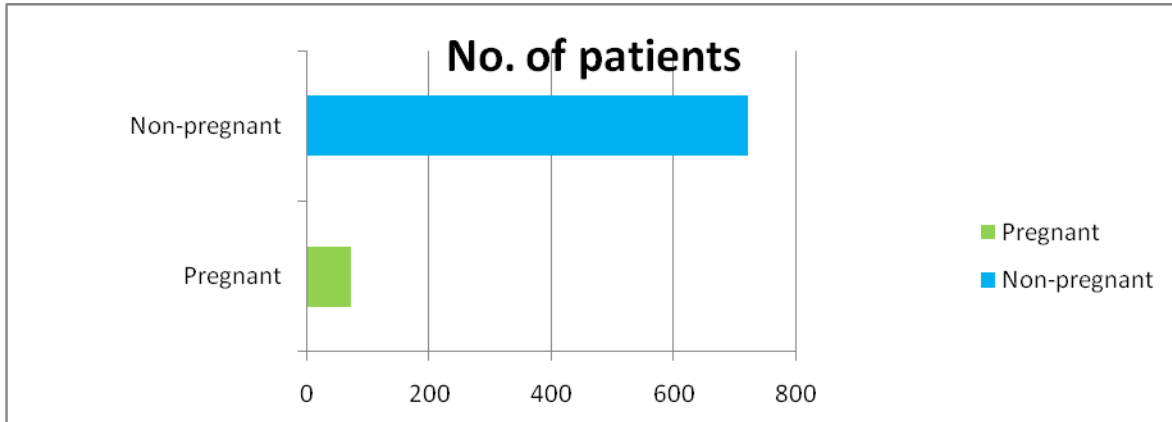


Fig no: 2

**Table no: 3**

	No. of patients(n=794)	Percentage
Pregnant women	73	9.2%
Non-pregnant women	721	90.8%



**Fig no: 3**

**Table no: 4 Type of UTI**

UTI	No. of patients Pregnant (n=73)	No. of patients Non- Pregnant (n=721)	Total (n=794)
Urethritis	51	590	641
Cystitis	13	79	92
Pyelonephritis	7	52	59
Yeast infection	0	2	2

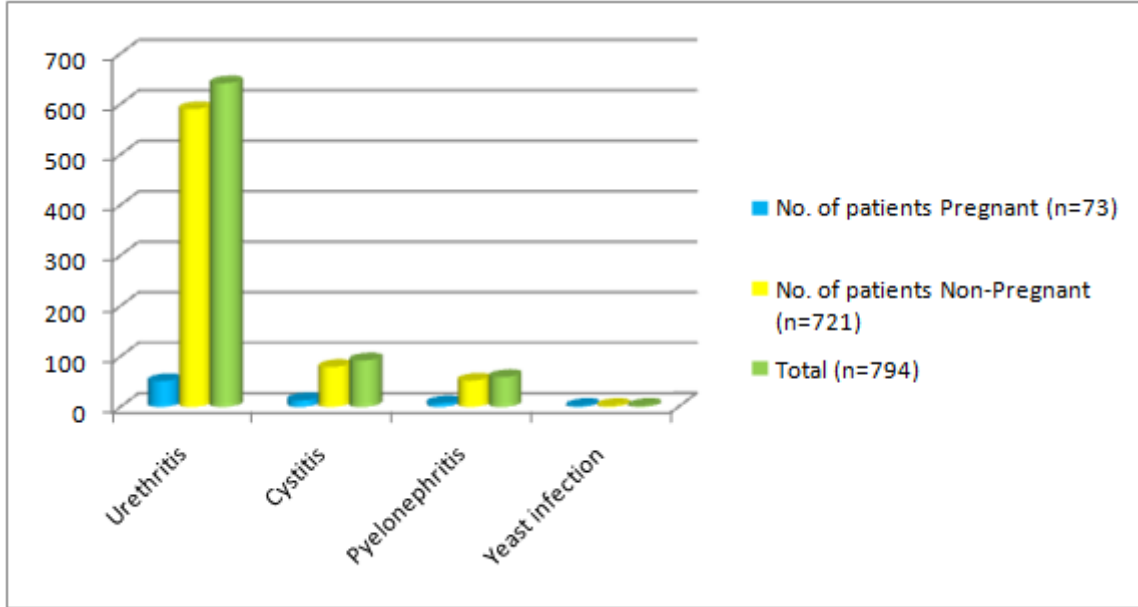


Fig no: 4

Table no: 5 Pus cells

Pus cells	No. of patients(n=794)	Percentage
1-3/hpf	23	3%
4-7/hpf	739	93%
8-10/hpf	32	4%

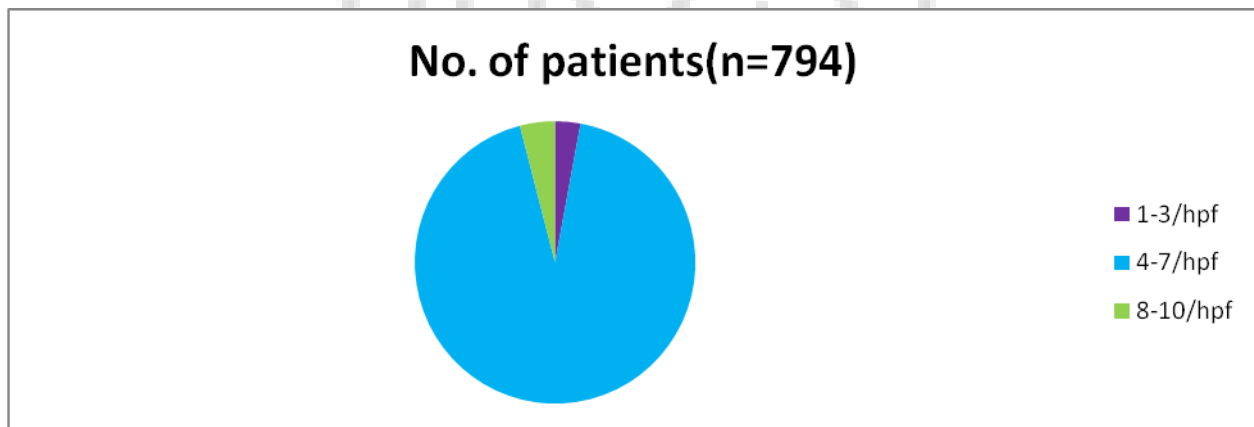


Fig no: 5

Table no: 6 Organism observed in urine sample

Organism observed	Pregnant patients(n=73)	Non-pregnant patients(n=721)
<i>Escherichia Coli</i>	58	544
<i>Klebsiella species</i>	4	52
<i>Pseudomonas species</i>	2	49
<i>Enterococcus species</i>	3	31
<i>Proteus mirabilis</i>	1	7
<i>Staphylococcus aureus</i>	2	4
<i>Staphylococcus saprophyticus</i>	2	29
<i>Streptococcus species</i>	1	5

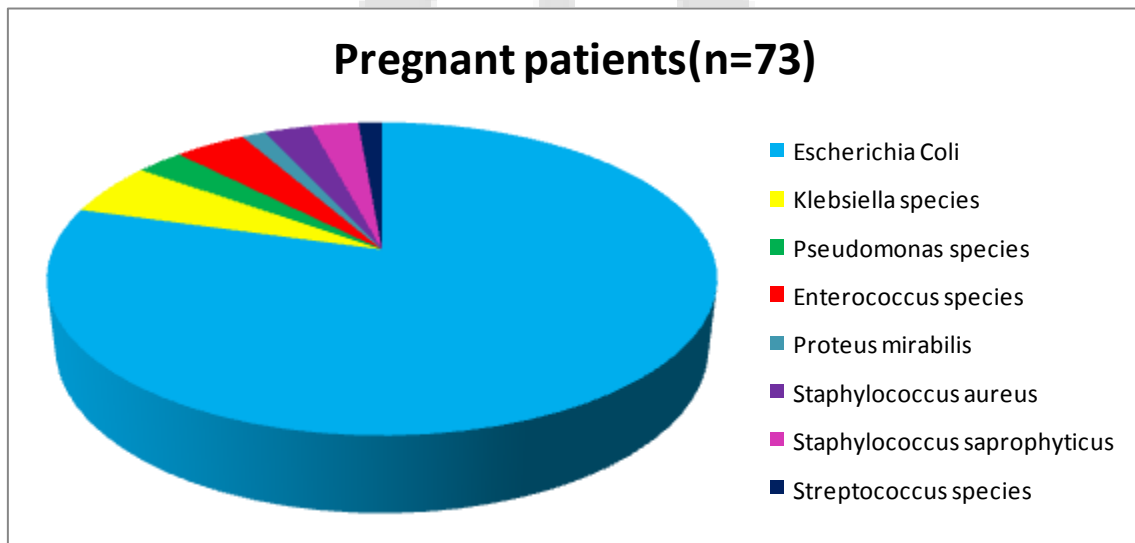
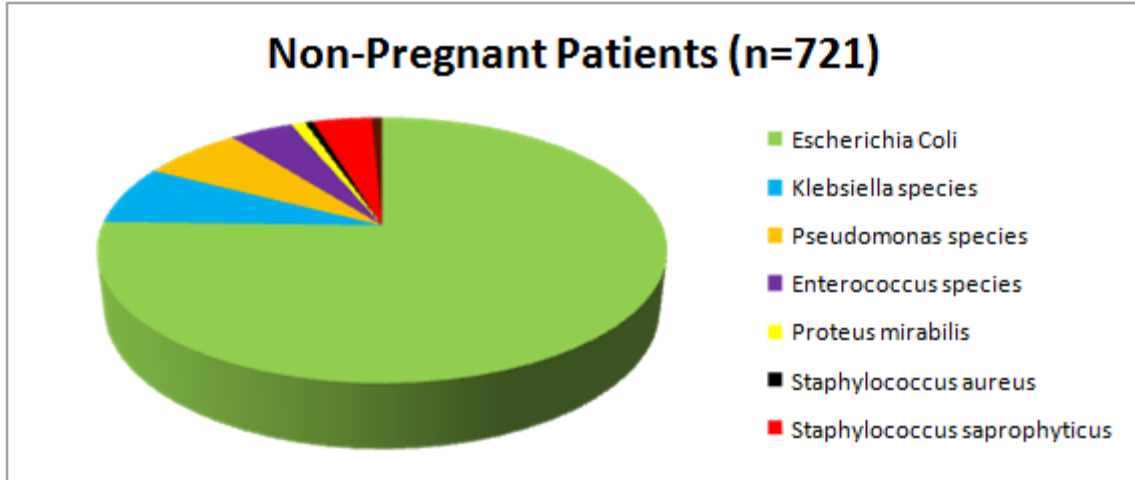


Fig no: 6 Micro-organisms observed in pregnant patients in mid-stream urine culture.

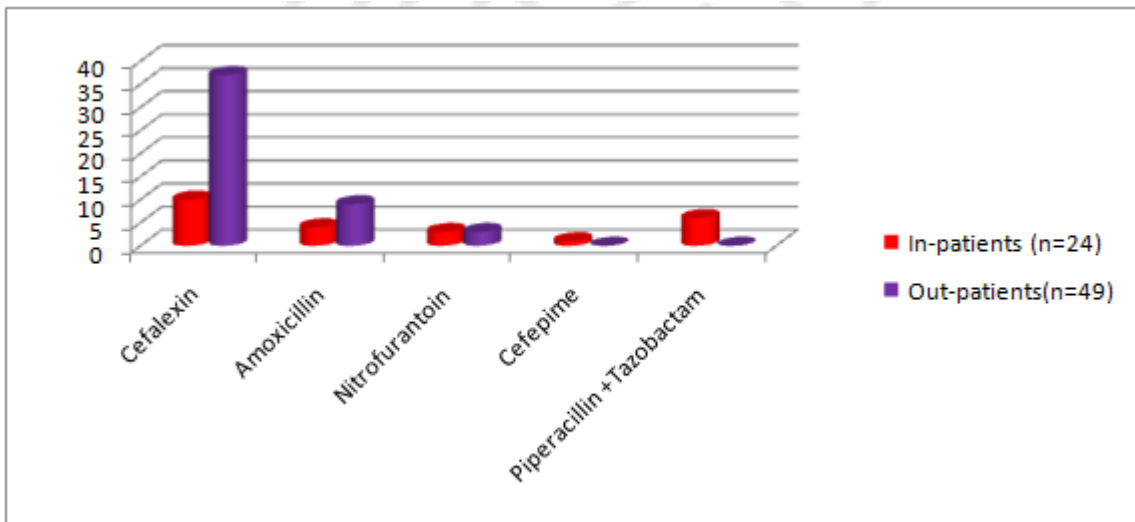




**Fig no: 7** Micro-organisms observed in non-pregnant patients in mid stream urine culture.

**Table no: 7** Treatment of choice for UTI in pregnancy (n=73)

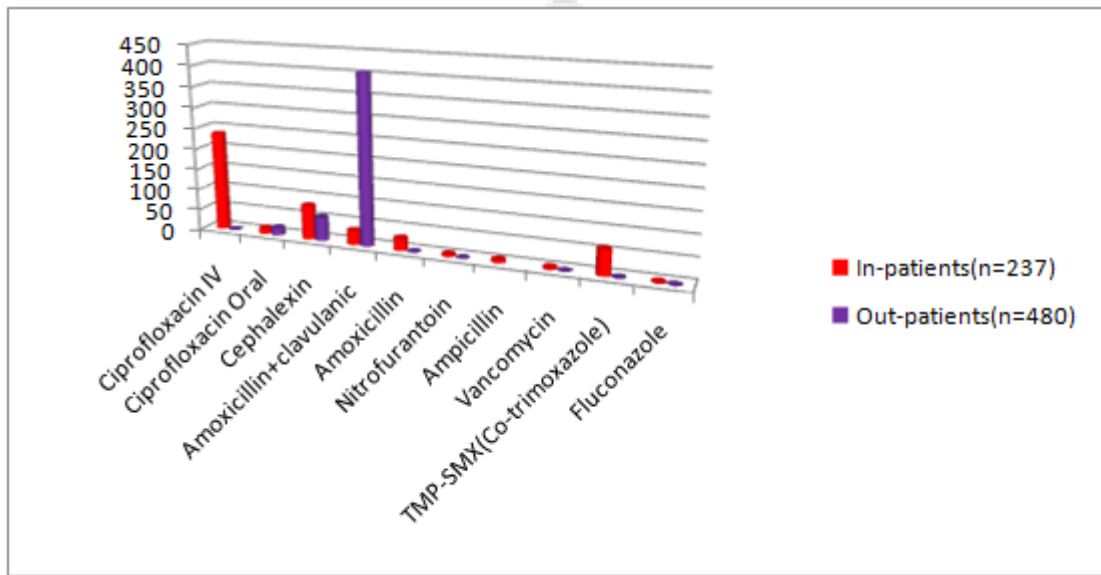
	In-patients (n=24)	Out-patients(n=49)
Cefalexin	10	37
Amoxicillin	4	9
Nitrofurantoin	3	3
Cefepime	1	0
Piperacillin +Tazobactam	6	0



**Fig no: 8**

**Table no: 8 Treatment of choice for UTI in non-pregnant women (n=721)**

Drug	In-patients(n=237)	Out-patients(n=480)
Ciprofloxacin IV(Single dose)	237	0
Ciprofloxacin Oral	13	18
Cephalexin	82	57
Amoxicillin+clavulanic	34	405
Amoxicillin	29	0
Nitrofurantoin	5	0
Ampicillin	7	
Vancomycin	4	0
TMP-SMX(Co-trimoxazole)	61	0
Fluconazole	2	0



**Fig no: 9**

**Table no: 9 Treatment of choice for women with breast feeding and were not pregnant**

Drugs	Breast feeding women(n=4), out-patients	Percentage
Cephalexin	1	25%
Amoxicillin	2	50%
Amoxicillin+clavulanic acid	1	25%

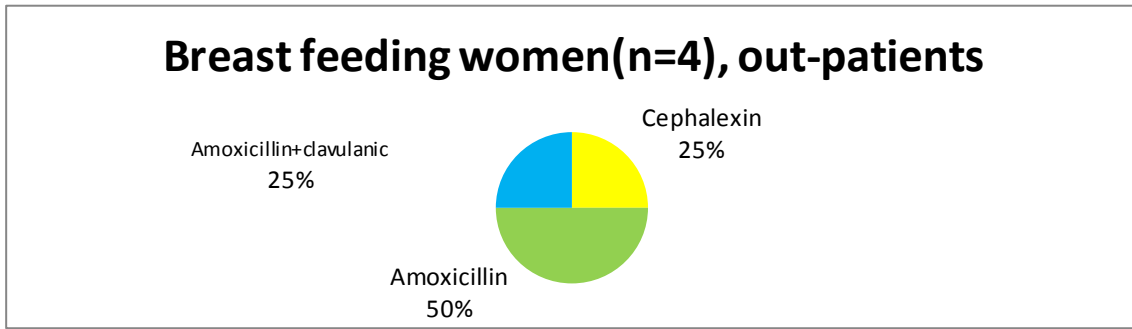


Fig no: 10

Table no: 10 Duration of stay in the hospital

Duration	No. of patients(n=261)	Percentage
<5 days	39	15%
5-10 days	158	60.5%
>10 days	64	24.5%

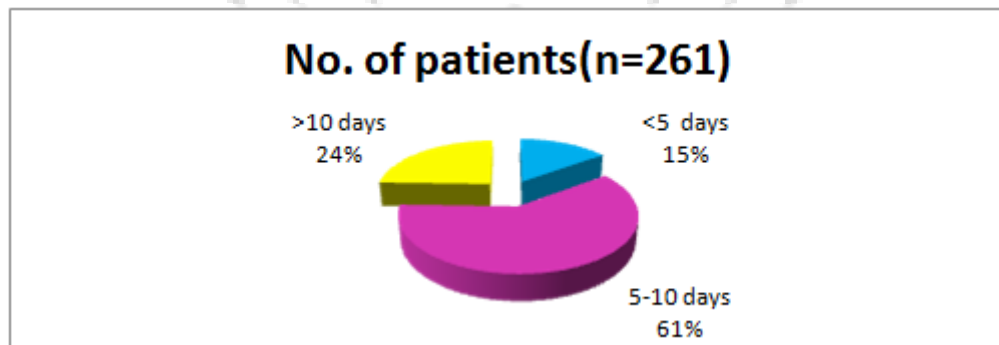
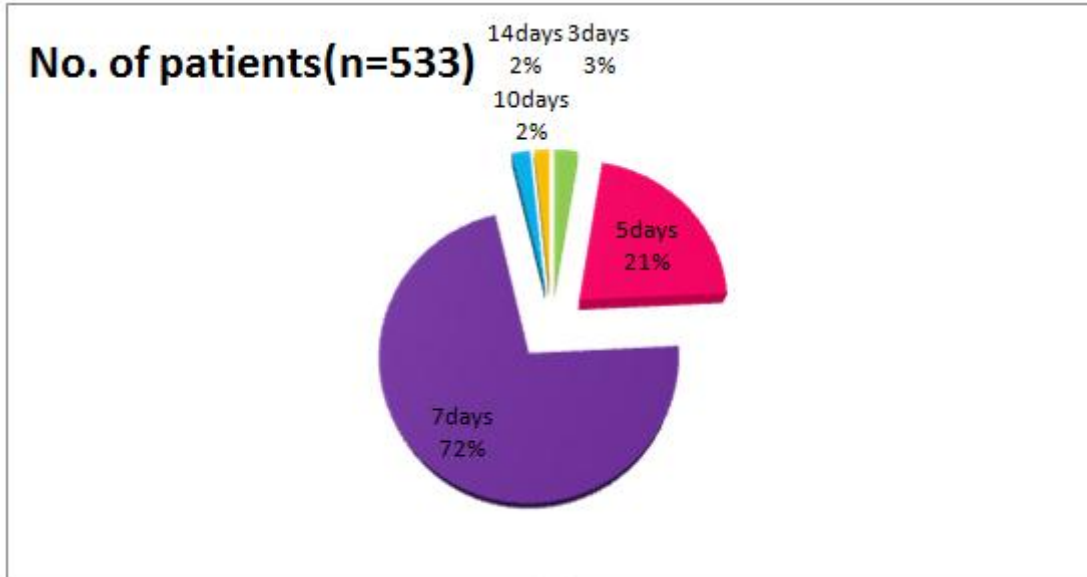


Fig no: 11 Duration of stay in the hospital

Table no: 11 Duration of medication prescribed for out-patients

Duration	No. of patients(n=533)	Percentage
3days	14	3%
5days	115	21%
7days	384	72%
10days	11	2%
14days	9	2%



**Fig no 12: Duration of medication prescribed for out-patient.**

## 5. DISCUSSION

In our study UTI cases were commonly high in the age groups in between 18-35 years and 261 patients were admitted to the hospital. All the patients were affected with symptomatic bacteriuria and were administered Ceftriaxone IM 1gm prior to the detection of the presence of organism in mid-stream urine (MSU) samples. A cross-sectional study was done in between pregnant women suffering from urinary tract infection was 9.2% and the patients who were not pregnant were about 90.8%. The study was conducted to compare the prescription patterns in between these two groups and the results were found to be as follows; in both the group patients were highly suffering from urethritis (81%) and the organism were detected in the mid-stream urine culture was *Escherichia Coli* in about 76% of the cases. Treatment of choice in pregnant was restricted to only these prescriptions like Cefalexin, Amoxicillin, Nitrofurantoin, Cefepime, Piperacillin+Tazobactam as they are safe in pregnancy. Wide variety of treatment of choice in the women who were not pregnant were administered based on the organism detected in the mid-stream urine sample and the prescriptions used were Ciprofloxacin IV, Ciprofloxacin Oral, Cephalexin, Amoxicillin+clavulanic acid, Amoxicillin, Nitrofurantoin, Ampicillin, Vancomycin, TMP-SMX(Co-trimoxazole) and Fluconazole (treatment of yeast infection), and the patients who were breastfeeding were prescribed with Cephalexin, Amoxicillin, Amoxicillin+clavulanic as it

doesn't enter breast milk. Antibiotic use was found to be reasonable and rational in most of the cases, all the antibiotics were prescribed from inside the Essential Drug list (EDL). Prescribers should be suggested to prescribe the drugs by their generic names. Prescribing the drugs by its generic names can reduce prescribing & dispensing errors; and also benefit inventory control.

## 6. CONCLUSION

From our study, we conclude that Cephalexin was highly prescribed in pregnant women's both in in-patient and out-patients. Whereas in the patients who were not pregnant were prescribed with ciprofloxacin and cephalexin in the in-patients; and Amoxicillin+Clavulanic acid (Augmentin) was prescribed to a maximum number of the patients in out-patient department. In the majority of the cases the predisposing factor of developing urinary tract infections was due to low hygiene and holding the urine for a longer time or with residual urine; and other causes are pregnancy (33%), diabetes (19%), use of spermicidal contraceptive jellies (2%). All the patients were counseled about the disease and awareness of developing UTI and to prevent reoccurrence.

## 7. Acknowledgement:

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## 8. Conflict of interest: None

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