A PROSPECTIVE STUDY ON PRESCRIBING PATTERN OF ANTIBIOTICS IN URINARY TRACT INFECTION IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Infection of the urinary tract is identified by growth of significant number of organisms of a single species in the urine in the presence of symptoms. Urinary tract infection is a common illness affecting both males and females in almost all age groups. It is important to intervene the progression by controlling the bacterial growth to prevent further complications like kidney infection by administration of antibiotics. Study on drug use evaluation on a tertiary care hospital was concluded.

Objective

- To study current trends in antibiotic prescription pattern in UTI patient.
- To obtain the information and rational use of first line choice of antibiotics.
- To obtain information about age group which is affected with UTI.
- To assess the appropriateness of medications prescribed for treating patients with UTI.
- To assess the different route of administration and formulation resulting in better therapeutic outcome.

Method and Methodology

Prescribing pattern of antibiotics drug in tertiary care hospital in prospective observational study patient who were satisfying the inclusion criteria was enrolled into the study conducted for 6 month period. Data collection form and other relevant source from medical record department are used as source of data and material. Result: 150 UTI cases were examined...
and 56% were females and 44% were males in 1 to 80 age group. In the management of UTI monotherapy was preferred and having 55% of management rate with monotherapy and 45% of management rate with combination therapy which includes 35% of two drug therapy, 8.66% of three drug therapy and 2% of more than 3 drug therapy. Nitrofurantoin was the most preferred class of drug and least preferred class of drug was glycopeptide antibiotic. Majority of patients were in age group between 40 to 59 (41%). More than 18% deviation from Indian guidelines was seen. Conclusion: The choice of antibiotic drug should be individualized based on patient compliance, adverse effects, availability and costing factors, along with prevailing sensitivity pattern in the locality. Nitrofurantoin can be a better alternative for uncomplicated UTI when compared to 3rd generation Cephalosporins. A 82% adherence to Indian guidelines was observed in the treatment.

**KEYWORDS:** Antibiotic, Urinary tract infection, Prescription pattern.

**INTRODUCTION**

**Antibiotics**

and is used as the treatment of external or internal infections. While some antibiotics are produced by microorganisms, most are manufactured synthetically.

**Classification of Antibiotics**

The most effective classification is one derived from the chemical composition. The main classifications are:

- Beta lactams.
- Macrolides.
- Fluroquinolones.
- Tetracyclins.
- Aminoglycosides.

The beta lactams include pencillins and cephalosporins. Ex: amoxicillin, cefuroxime, ceftriaxone, ampicillin etc.

MOA: inhibits the bacterial cell wall production.

- Macrolides hinder bacterial protein synthesis. Ex: azithromycin, clarithromycin, etc,
- Fluroquinolones prevents bacteria from producing DNA. Ex: ciprofloxacin, levofloxacin, etc.
Teracyclines inhibits bacterial ability to produce protein. Ex: tertracycline, doxycycline etc.

Aminoglycosides inhibits bacterial protein synthesis. Ex: amikacin, gentamycin, streptomycin, etc.

**Urinary Tract Infection**

A urinary tract infection (UTI) is an infection from microbes. These are organisms that are too small to be seen without a microscope. Most UTIs are caused by bacteria, but some are caused by fungi and in rare cases by viruses. UTIs are among the most common infections in humans.

A UTI can happen anywhere in your urinary tract. Your urinary tract is made up of your kidneys, ureters, bladder, and urethra. Most UTIs only involve the urethra and bladder, in the lower tract. However, UTIs can involve the ureters and kidneys, in the upper tract. Although upper tract UTIs are more rare than lower tract UTIs, they’re also usually more severe.

**Epidemiology**

UTIs are the most common outpatient infections in the United States. With the exception of a spike in young women aged 14 to 24 years old, the prevalence of UTIs increases with age. The prevalence in women over 65 years of age is approximately 20%, compared with approximately 11% in the overall population. Between 50% and 60% of adult women will have at least one UTI in their life, and close to 10% of post menopausal women indicate that they had a UTI in the previous years.

**Classification**

An infection can happen in different parts of your urinary tract. Each type has a different name, based on where it is.

**Cystitis (bladder):** You might feel like you need to pee a lot, or it might hurt when pee. Patient might also have lower belly pain and cloudy or bloody urine.

**Pyelonephritis (kidneys):** This can cause fever, chills, nausea, vomiting, and pain in your upper back or side.

**Urethritis (urethra):** This can cause a discharge and burning when pee.
**Fig 1: Classification of UTI.**

**Aetiology and Risk Factors**

Anything that reduces bladder emptying or irritates the urinary tract can lead to UTIs. There are also many factors that can put you at an increased risk of getting a UTI. These factors include:

- **Age** — older adults are more likely to get UTIs.
- Reduced mobility after surgery or prolonged bed rest.
- Kidney stones.
- A previous UTI.
- Urinary tract obstructions or blockages, such as an enlarged prostate, kidney stones, and certain forms of cancer.
- Prolonged use of urinary catheters, which may make it easier for bacteria to get into your bladder.
- Diabetes, especially if poorly controlled, which may make it more likely for you to get a UTI pregnancy.
- Abnormally developed urinary structures from birth.
- A weakened immune system Additional UTI risk factors for men.
Clinical Presentation
Symptoms of a UTI depend on what part of the urinary tract is infected.

Lower tract UTIs affect the urethra and bladder.
Symptoms of a lower tract UTI include
- Burning with urination.
- Increased frequency of urination without passing much urine.
- Increased urgency of urination.
- Bloody urine.
- Cloudy urine.
- Urine that looks like cola or tea.
- Urine that has a strong odor.
- Pelvic pain in women.
- Rectal pain in men.

Upper tract UTIs affect the kidneys.
These can be potentially life threatening if bacteria move from the infected kidney into the blood. This condition, called urosepsis, can cause dangerously low blood pressure, shock, and death.

Symptoms of an upper tract UTI include.
- Pain and tenderness in the upper back and sides.
- Chills.
- Fever.
- Nausea.
- Vomiting.
Complication

- Recurrent infections.
- Permanent kidney damage.
- Urethral narrowing (stricture).
- Sepsis.

Diagnosis

Upper tract UTIs

- CBC.
- Blood Culture.
- Urine Test.

Recurrent UTIs

- An ultrasound, in which a device called a transducer is passed over your abdomen. The transducer uses ultrasound waves to create an image of your urinary tract organs that are displayed on a monitor.
• An intravenous pyelogram (IVP), which involves injecting a dye into your body that travels through your urinary tract and taking an X-ray of your abdomen. The dye highlights your urinary tract on the X-ray image.

• A cystoscopy, which uses a small camera that’s inserted through your urethra and up into your bladder to see inside your bladder. During a cystoscopy, your doctor may remove a small piece of bladder tissue and test it to rule out bladder inflammation or cancer as a cause of your symptoms.

• A computerized tomography (CT) scan to get more detailed images of your urinary system.

Non Pharmacological Treatment
• Adequate fluid intake
• Eating yogurt
• Ingestion of Cranberry juice
• Voiding after sexual intercourse
• Vaginal application of lactobacilli
• Avoiding constipation
Fig 3: Working Party Groups Consensus Guideline On The Diagnosis And Management Of Uncomplicated Uti.
Pharmacological Treatment

Antibiotics for UTI

The form of antibiotic used to treat a bacterial UTI usually depends on what part of the tract is involved. Lower tract UTIs can usually be treated with oral antibiotics. Upper tract UTIs require intravenous antibiotics. These antibiotics are put directly into your veins.

Sometimes, bacteria develop resistance to antibiotics. To reduce your risk of antibiotic resistance, your doctor will likely put you on the shortest treatment course possible. Treatment typically lasts no more than 1 week.

Results from your urine culture can help your doctor select an antibiotic treatment that will work best against the type of bacteria that’s causing your infection.

Treatments other than antibiotics for bacterial UTIs are being examined. At some point, UTI treatment without antibiotics may be an option for bacterial UTIs by using cell chemistry to change the interaction between the body and the bacteria.

First Line Antibiotics

Nitrofurantoin

Cephalosporin

- Cefoperazone.
- Ceftriaxone.
- Cefpodoxime Proxetil.
- Cefixime.
- Cefuroxime.

Quinolones

- Ciprofloxacin.
- Ofloxacin.
- Norfloxacin.

Aminoglycosides

- Amikacin.
- Clindamycin.
Pencillin Antibiotics
- Amoxiclav.

Beta Lactamase Antibiotics
- Piperacillin + Tazobactum.

Fig 4: Algorithm For The Management Of Uti.
Objectives of The Study

Primary Objectives

- To study current trends in Antibiotic prescription pattern in Urinary tract infection patient.

Secondary Objective

- To obtain the information and rational use of first line choice of antibiotics.
- To obtain information about age group which is most affected with UTI.
- To assess the medications prescribed for treating patients with UTI.
- To assess the different route of administration and formulation resulting in better therapeutic outcome.

Review of Literature

[4] Ramanath H et al (2019 march) conducted a study to evaluate prescribing pattern of antibiotic usage for urinary tract infection treated in a rural tertiary care hospital. The objective was to study the prescription pattern of antibiotics used in the treatment of UTI. A prospective cross sectional study was conducted on patients diagnosed with UTI. The study was carried out in the General medicine, OBG, Surgery and Urology departments of both in-patients and out-patients, for a period of 9 months (June 2010 to Feb 2011). Urinary Tract Infection patients who were in the age group of 18-80 years were included after obtaining their informed consent. A suitable data collection form was prepared and used to collect the required data. Among 136 patients, 41 were inpatients and 95 were out-patients. Most of the in-patients were prescribed with Ceftriaxone 28(68.3%), Cefotaxim 5(12.2%), and Ciprofloxacin 3 (7.3%) respectively. In out-patients, Ciprofloxacin 27(28.4%), Norfloxacin 21(22.1%) and Nitrofurantoin 18(18.9%) were prescribed respectively. The study found that gram negative organisms like E. coli was the most predominant organism. It was also found that Cephalosporin's were most commonly used and Quinolones were the second most commonly used drugs for the treatment of UTI. The third category drug used in UTI female patients was nitrofurantoin which is relatively inexpensive and safe for Both pregnant and non-pregnant women.

[5] Dinesh K Dhodi et al (2019 January) was conducted a study to evaluate prescribing pattern of antibiotics among patients of urinary tract infection. The objective of the study was to determine the prescription pattern of antibiotics and response to various antibiotics and other therapeutic consideration in patients of complicated UTI. The observational prospective
analytical study conducted in department of nephrology, grant government medical college and sir JJ group of hospitals Mumbai. A total percentage of patients having UTI was 13.08%. Of these 200 patients, 119 were female (60%) and 81 patients were male (41%). Among male the prevalence was seen more in geriatric age group and among female in adult group. Quinolones were the most commonly prescribed first line drug followed by beta lactamase inhibitors. Combination such as cefoperazone + linezolid were the most commonly prescribed second line drug followed by combination of ceftriaxone or cefoperazone with metronidazole. Paracetamol was the most common non Antibiotic support given. The result of the study may not be representative of the general population; but UTI's are often treated empirically and susceptibility tests are often carried out only when the patient has failed one or more courses of antibiotics.

[6] Jyotirmoy Adhikary et al (2019 January) was conducted a study to analyse and assess the rationality of prescribed antimicrobials in paediatric urinary tract infection. This prospective observational study was done in the department of Paediatrics in a teaching hospital in Nepal for 6 months duration in patients under 16 years of age diagnosed as UTI without any other co-morbidity. Data was collected by using a self-designed data collection form. In this study, out of 71 patients the percentage of male and female patients were 42.25% and 57.74% respectively. Escherichia coli was the most common organism responsible for paediatric urinary tract infection (59.15%). Most commonly used antibiotics as a single drug was ceftriaxone (23.94%). Amikacin with ceftriaxone was most commonly prescribed antimicrobial combination (25.35%). Number of drugs per prescription and number of antibiotics per prescription was 2.42 ± 0.64 and 1.30 ± 0.46 respectively; percentage of drugs prescribed by generic name was 83.7%. In this study Drugs were prescribed for proper indications, in proper dosage and for appropriate duration.

[7] Shekar M et al (2018 December) conducted a study to assess the Prescribing pattern and rational use of Antibiotics in UTI Patients in a tertiary care hospital. A prospective observational study was carried out in 100 patients in a tertiary care teaching hospital, by collecting patient data from the medical records of patients from General Medicine Department. In this study the Analysis of prescribed drugs revealed that use of antibiotics like Ceftriaxone (35%) and Amikacin (22%) were significantly higher than other drugs prescribed such as Ciprofloxacin (16%), Nitrofurantoin (15%), Ofloxacin (5%), Cefixime (3%), Moxifloxacin (2%) and Clarithromycin (2%). Culture sensitivity test was done only in 30%
of the total cases (100) for which empirical treatment had to be applied rather than specific antibiotic treatment. The most common isolated organisms were E.coli (60%), Proteus (20%), Klebsiella (13.33%) and Psedomonas (6.66%). Cephalosporins, Aminoglycosides and Quinolones were the most commonly prescribed antibiotics in this study.

[8] Monique R Bidell et al (2018 July) conducted a study to describe and characterize the prescription of antibiotics for urinary tract infection (UTI) in general practice in Denmark and to evaluate compliance with current recommendations. The study was a National registry-based study. 267,539 patients who redeemed a prescription for antibiotics with the clinical indication UTI at community pharmacies between July 1st 2017 and June 31st 2018. Main outcome measures: Antibiotics prescribed for 1) acute lower UTI, 2) acute upper UTI and 3) recurrent UTI presented as amount of prescriptions, number of treatments per 1000 inhabitants per day (TID) and defined daily doses per 1000 inhabitants per day (DID). A total of 507,532 prescriptions were issued to 267,539 patients during the one year study period, representing 2.35 DID. Acute lower UTI was the most common reason for prescription of antibiotics (89.5%) followed by recurrent UTI (8.4%). The majority of the prescriptions were issued to people above 60 year old (57.6%). Pivmecillinam was the most commonly prescribed antibiotic in acute lower (45.8%) and acute upper (63.3%) UTI. Trimethoprim was the most commonly prescribed antibiotic in recurrent UTI (45.9%). Prescription of quinolones increased with increasing patient-age \((p = <.0001)\). Compliance with current Danish recommendations was moderately high. Pivmecillinam is the first line antibiotic for the management of acute lower and upper UTI, and trimethoprim is the first line option of recurrent UTI. A high proportion of the antibiotic prescriptions were issued in the elderly population including a relatively high prescription rate of quinolones.

[9] Carmen Ka Man Ko et al (2018 April) conducted a study to study to investigate the antibiotic prescription patterns in female patients with uncomplicated UTI. A prospective cohort study was conducted in 12 primary care group clinics in Hong Kong of patients presenting with symptoms of uncomplicated UTI from January 2017 to December 2018. Patients’ characteristics such as age, comorbidity, presenting symptoms and prior antibiotic use were recorded by physicians, as well as any empirical antibiotic prescription given at presentation. Univariate analysis was conducted to identify factors associated with antibiotic prescription. A total of 298 patients were included in the study. The overall physician antibiotic prescription rate was 82.2%. Amoxicillin (39.6%) and nitrofurantoin
(28.6%) were the most common prescribed antibiotics. Meanwhile, whilst physicians in public primary care prescribed more amoxicillin (OR: 2.84, 95% CI: 1.67 to 4.85, P<0.001) and nitrofurantoin (OR: 2.01, 95% CI: 1.14 to 3.55, P = 0.015), physicians in private clinics prescribed more cefuroxime and ciprofloxacin (P<0.05). Matching of antibiotic prescription occurred in public than private primary care prescriptions (OR: 6.72, 95% CI: 2.07 to 21.80 P = 0.001). Mismatching differences of antibiotic prescription was not evident. nitrofurantoin and amoxicillin should be used as first line antibiotic treatment for uncomplicated UTI. There were significant differences in antibiotic prescription patterns between public and private primary care. Public primary care practitioners were more likely to prescribe first line antibiotic treatment which match antibiotic sensitivity of E. coli isolates and other uropathogens.

Fayissa B et al (2016 may )conducted a study to assess the utilization pattern of antibiotics in urinary tract infection patients in Jimma University Specialized Teaching Hospital. A cross-sectional study was conducted during 2015-2016. Prescribed parameters related to patients, prescribers, the medications prescribed and errors associated with these parameters were compiled from patient record data. The parameters were matched against WHO prescribing recommendations. A total of 282 cards of urinary tract infection patients were observed during the study period. Out of these, 170 (60.3%) were prescribed for females. From the total 282 prescriptions, 264 (93.6%) contained one drug, while 17 (6.0%) prescriptions had two drugs per encounter. All the antibiotics were prescribed in their generic name. Fluoroquinolones 189 (67.0%) were the most prescribed drugs, followed by penicillin 54 (19.1%), tetracycline 16 (5.7%) and sulfa drugs 14 (5.0%). Important information frequently overlooked by prescribers were physician signatures 34 (62.9%), dosage forms 10 (18.5%) and quantity of drugs 8 (14.8%). Average number of antibiotics prescribed per encounter and percentage of encounters with an injection prescribed were 1.07 and 15.25%, respectively. The prescribing patterns of antibiotics in urinary tract infection patients was found to be good as the drugs were prescribed from national treatment guidelines and in their generic name. However, some important information was frequently missing such as physician signature, dosage form and quantity of treatment.

Monique R. Bidell et al(2016 march) was conducted a study on Flouroquinolone and Third-generation –cephalosporin Resistance Among Hospitalized Patients With Urinary Tract Infections Due to Escherichia coli. This analysis of nearby 10,000 hospital-associated UTI
episodes due to Escherichia coli showed that fluoroquinolone and third-generation-cephalosporin resistance rates were 34.5% and 8.6%, respectively the rate of concurrent resistance to both agents was 7.3%. Fluoroquinolone resistance rates exceeded 25% regardless of geographic location or hospital characteristics. The findings suggest that fluoroquinolones should be reserved and third-generation cephalosporins be used with caution as empirical agents for hospitalized patients with UTIs due to E.coli. Overall there were several notable resistance patterns in this analysis of nearly 10,000 episodes of UTIs due to E.coli across approximately 160 US hospitals. It was a retrospective observational study. Non susceptibility was determined according to individual guidelines for susceptibility testing at each participating site. Fluoroquinolone resistance was defined a non susceptibility to levofloxacin, ciprofloxacin or gatifloxacin. Third generation cephalosporin resistance, a surrogate marker of organisms that produce an extended spectrum b-lactamase was classified as non susceptibility to ceftazidime, ceftriaxone or cefotaxime.

[12] M.M.P.S.C Fernando et al (2015 July) was conducted a study on Extended Spectrum Beta Lactamase Producing Organisms Causing Urinary Tract Infections in Sri Lanka and Their Antibiotic Susceptibility Pattern. It was a hospital based cross sectional study. Extended spectrum Beta-Lactamase producing organisms causing UTIs are increasing in incidence and pose a major burden to health care. The methods include patients with confirmed ESBL-UTI admitted to professorial Medical Unit, Colombo North Teaching Hospital from January – June 2015 were recruited to the study. Their urine culture and antibiotic susceptibility reports were evaluated after obtaining informed written consent. Of 61 culture positive ESBL-UTIs, E.coli caused 53( 86.8%) followed by klebsiella had a history of hospitalization within the past three months and included. They observed a higher percentage of E.coli over klebsiella as ESBL producing organisms suggesting most ESBL-UTIs to be community acquired, Carbapenems seem to remain as the first line therapy for majority of ESBL-UTIs in the local setting. Although prior antibiotic utilization and hospitalization may contribute to emergence of ESBL producing klebsiella and E.coli in Sri Lanka, high prevalence of community acquired ESBL-E.coli needs further investigations to identify potential causes.

[13] Maike Koningston et al (2014 December) was conducted a study on Recommendations For The Empirical Treatment of Complicated UTIs Using Surveillance Data On Antimicrobial Resistance. They collected data from surveillance can be used to guide the
empirical treatment choices of clinicians when treating UTIs. They included the first isolate per patient of urine samples of hospitalized patients collected by the infectious disease surveillance information system for antibiotic resistance in 2014 and determined the probability of inadequate coverage for antimicrobial agents based on species distribution and susceptibility. The most prevalent bacteria in 27,922 isolates of 23,357 patients were E.coli (47%), Enterococcus species (14%), Proteus mirabilis (8%) and Klebsiella pneumonia (7%). When including gram negative bacteria only, the probability of inadequate coverage was 4%, 2.7%, 2.3% and 1.7%, respectively, for amoxicillin, amoxicillin-clavulanic acid, or a third generation cephalosporin in combination with gentamycin, and the carbapenems. When excluding Enterococcus species considered as less virulent and the carbapenems, considered as last-resort drugs, empirical treatment for c-UTI with the best chance of adequate coverage are one of the studied beta-lactam – gentamycin combinations.

[14] Samira Kumar Naik et.al was conducted a study on antimicrobial prescribing pattern in urinary tract infection in a tertiary care hospital. The observational study was planned to generate data on antimicrobial use pattern in UTI which could be beneficial in selection of rational drug therapy in UTI. The retrospective study was carried out by analysing indoor and outpatient department case records of UTI patients of tertiary care hospital. The demographic data and prescription pattern, urine culture report, along with the antimicrobial sensitivity testing were evaluated. The escherichia coli was the most common organism to be isolated in urine culture followed by staphylococcus aureus. Cephalosporin was the most prescribed antibiotics in all age groups. Although Nitrofurantoin and cotrimoxazole were showing good sensitivity pattern when compared with other antimicrobial groups. Nitrofurantoin can be better alternative for uncomplicated UTI when compared to 3rd generation Cephalosporins.

METHODOLOGY

4.1 Study Duration

- The study will be conducted for a period of 6 months.

4.2 Site of the Study

- Study will be conducted at Aster CMI Hospital, Bangalore and at Government Hospital, Yelahanka.

4.3 Study Design

- A prospective study in tertiary care hospital.
4.4 Size of Study

- Study conducted in 150 patients.

4.5 Sources of Data and Materials

- Patient case sheet.
- Medication/Treatment chart.
- Laboratory report.

4.6 Study Criteria

**Inclusion Criteria**

- In patients who are diagnosed as suffering from UTI.
- Patients in all age groups.
- Patients with or without other comorbidities like Diabetes and Hypertension.
- Gender of patients: either gender

**Exclusion Criteria**

- Pregnant and lactating women.

4.7 Method of Data Collection

- Data collection form.
4.8 Study Procedure

1. This is a prospective observational study, the patients who were satisfying the inclusion criteria will be enrolled into the study. The clinical pharmacist will review the patients case notes, medication chart, laboratory data, and prescriptions.

2. A suitable designed data collection form will be used to record all the necessary data including patient demographic details, patient medication history, and reason for admission, Patient medical history, allergies, and lab investigations.

3. Appropriateness of medications prescribed for treating patients with UTI is compared with World Health Organisation (WHO) and Indian guidelines.

4. Regimen of the medications selected for treating patients with UTI is evaluated from patient profile forms.

5. Prescribing pattern of medications in patients with various types of UTI is studied by taking 150 cases of patients suffering from UTI.

Result and Interpretation

We had done analysis in 150 cases in tertiary care hospital in that.
Table 1: Gender Wise Distribution of Patients.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>TOTAL NUMBER</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>66</td>
<td>44.03%</td>
</tr>
<tr>
<td>FEMALE</td>
<td>84</td>
<td>55.9%</td>
</tr>
</tbody>
</table>

- 150 cases were examined tertiary care hospital among that 44.03% were male and 55.9% were female

Gender

![Gender Distribution Chart](image)

FIG 1: Gender Wise Distribution of Patients.

TABLE 2: Age Wise Distribution of Patients.

<table>
<thead>
<tr>
<th>AGE</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-19</td>
<td>18</td>
<td>12</td>
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<td>20-39</td>
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<td>15</td>
</tr>
<tr>
<td>40-59</td>
<td>18</td>
<td>43</td>
</tr>
<tr>
<td>60-79</td>
<td>26</td>
<td>14</td>
</tr>
<tr>
<td>80-100</td>
<td>03</td>
<td>0</td>
</tr>
</tbody>
</table>
Fig 2: Age Wise Distribution of Patients.

TABLE 3: Class of antibiotics Prescribed For UTI Patients.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Classes of drugs</th>
<th>No. of Prescription</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NITROFURANTOIN</td>
<td>56</td>
<td>37%</td>
</tr>
<tr>
<td>2</td>
<td>CEPHALOSPORINS</td>
<td>34</td>
<td>22.66%</td>
</tr>
<tr>
<td>3</td>
<td>QUINOLONES</td>
<td>21</td>
<td>14%</td>
</tr>
<tr>
<td>4</td>
<td>AMINOGLYCOSIDES</td>
<td>09</td>
<td>6%</td>
</tr>
<tr>
<td>5</td>
<td>PENCILLIN ANTIBIOTICS</td>
<td>11</td>
<td>7.3%</td>
</tr>
<tr>
<td>6</td>
<td>BETA LACTAMASE</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>7</td>
<td>LINCOMYCIN</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>8</td>
<td>GLYCOPEPTIDES</td>
<td>4</td>
<td>2.6%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>150</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Classes of Antibiotics

Fig 3: Classes of Antibiotics Prescribed.
TABLE 4: Pattern Of Drug Regimen Prescribed.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>THERAPY</th>
<th>NUMBER</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MONOTHERAPY</td>
<td>82</td>
<td>55%</td>
</tr>
<tr>
<td>2</td>
<td>TWO DRUG THERAPY</td>
<td>52</td>
<td>35%</td>
</tr>
<tr>
<td>3</td>
<td>THREE DRUG THERAPY</td>
<td>13</td>
<td>8.66%</td>
</tr>
<tr>
<td>4</td>
<td>&gt;3 DRUG THERAPY</td>
<td>03</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

In the management of UTI mono therapy was preferred and having 55% of management rate with mono therapy and 45% of management with combination therapy which includes 35% of two drug therapy. 9% of three drug therapy and 2% of more than 3 drug therapy.

![Fig 4: pattern of drug regimen prescribed.](image)

Table 5: Drugs Prescribed For UTI.

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>DRUGS</th>
<th>NO. OF PRESCRIPTIONS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NITROFURANTOIN</td>
<td>56</td>
<td>37%</td>
</tr>
<tr>
<td>2</td>
<td>CIPROFLOXACIN</td>
<td>11</td>
<td>7.3%</td>
</tr>
<tr>
<td>3</td>
<td>CEFOPERAXONE+SULBACTUM</td>
<td>08</td>
<td>5.3%</td>
</tr>
<tr>
<td>4</td>
<td>CEFTRIAXONE</td>
<td>07</td>
<td>4.6%</td>
</tr>
<tr>
<td>5</td>
<td>AMIKacin</td>
<td>09</td>
<td>0.6%</td>
</tr>
<tr>
<td>6</td>
<td>OFLOXACIN</td>
<td>06</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>CEFOPERAXONE</td>
<td>01</td>
<td>0.6%</td>
</tr>
<tr>
<td>8</td>
<td>NORFLOXACIN</td>
<td>04</td>
<td>2.6%</td>
</tr>
<tr>
<td>9</td>
<td>CEFPODOXIME PROXETIL</td>
<td>02</td>
<td>1.3%</td>
</tr>
<tr>
<td>10</td>
<td>PIPERACILLIN+ TAZOBACTUM</td>
<td>11</td>
<td>7.3%</td>
</tr>
<tr>
<td>11</td>
<td>AMOXICILLIN + CLAVULANIC</td>
<td>09</td>
<td>6%</td>
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<tr>
<td>12</td>
<td>CEFIXIME</td>
<td>04</td>
<td>2.6%</td>
</tr>
<tr>
<td>13</td>
<td>CEFUROXIME</td>
<td>10</td>
<td>6.6%</td>
</tr>
<tr>
<td>14</td>
<td>CLINDAMYCIN</td>
<td>06</td>
<td>4%</td>
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For the management of UTI 76 patients out of 150 were prescribed monotherapy in which NITROFURANTOIN was mostly prescribed i.e., 37%.

Fig 5: Drugs Prescribed.

Table 6: Class of Monotherapy Drugs.

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>CLASS OF DRUGS</th>
<th>NO. OF RESCRIPTIONS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NITROFURANTOIN</td>
<td>56</td>
<td>73%</td>
</tr>
<tr>
<td>2</td>
<td>PENCILLINS</td>
<td>08</td>
<td>9.8%</td>
</tr>
<tr>
<td>3</td>
<td>CEPHALOSPORINS</td>
<td>11</td>
<td>13.4%</td>
</tr>
<tr>
<td>4</td>
<td>AMINOGLYCOSIDE</td>
<td>04</td>
<td>4.9%</td>
</tr>
<tr>
<td>5</td>
<td>FLUROQUINOLONES</td>
<td>03</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

Fig 6: classes of monotherapy drug.
Table 7: Classes of Combination Therapy.

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>CLASS OF DRUGS</th>
<th>NO. OF RESCIPTIONS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CEPHALOSPORIN + FLUROQUINOLONES</td>
<td>03</td>
<td>4.4%</td>
</tr>
<tr>
<td>2</td>
<td>PENCILLINS + MEROPENEM</td>
<td>06</td>
<td>8.8%</td>
</tr>
<tr>
<td>3</td>
<td>CEPHALOSPORINS + LINCOMYCINS</td>
<td>04</td>
<td>5.8%</td>
</tr>
<tr>
<td>4</td>
<td>CEPHALOSPORINS + PENCILLINS</td>
<td>06</td>
<td>8.8%</td>
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<tr>
<td>5</td>
<td>CEPHALOSPORINS + AMINOGLYCOSIDES</td>
<td>11</td>
<td>16.1%</td>
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<tr>
<td>6</td>
<td>CEPHALOSPORINS + MACROLIDS</td>
<td>05</td>
<td>7.3%</td>
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<tr>
<td>7</td>
<td>PENCILLINS + CEPHALOSPORINS + LINCOMYCIN</td>
<td>04</td>
<td>5.8%</td>
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<tr>
<td>8</td>
<td>PENCILLINS + AMINOGLYCOSIDES + CEPHALOSPORINS</td>
<td>05</td>
<td>7.3%</td>
</tr>
<tr>
<td>9</td>
<td>PENCILLINS + MACROLIDS + QUINOLONES</td>
<td>02</td>
<td>2.9%</td>
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<tr>
<td>10</td>
<td>CEPHALOSPORINS + AMINOGLYCOSIDES + QUINOLONES</td>
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<tr>
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<td>CEPHALOSPORINS + MACROLIDS + AMINOGLYCOSIDES</td>
<td>05</td>
<td>7.3%</td>
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<tr>
<td>12</td>
<td>LINCOMYCIN + MACROLIDS + PENCILLINS</td>
<td>04</td>
<td>5.8%</td>
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<tr>
<td>14</td>
<td>PENCILLINS + AMINOGLYCOSIDES + CEPHALOSPORINS + MEROPENAM</td>
<td>04</td>
<td>5.8%</td>
</tr>
<tr>
<td>15</td>
<td>PENCILLINS + AMINOGLYCOSIDES + QUINOLONES + MEROPENAM</td>
<td>2</td>
<td>2.9%</td>
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<tr>
<td>16</td>
<td>PENCILLINS + QUINOLONES + CEPHALOSPORINS + LINCOMYCIN</td>
<td>2</td>
<td>2.9%</td>
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<tr>
<td>17</td>
<td>CEPHALOSPORINS + AMINOGLYCOSIDES + QUINOLONES + LINCOMYCIN</td>
<td>3</td>
<td>4.4%</td>
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<tr>
<td>18</td>
<td>CEPHALOSPORINS + AMINOGLYCOSIDES + MEROPENAM + GLYCOPEPTIDE + PENCILLINS</td>
<td>1</td>
<td>1.4%</td>
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<tr>
<td>S</td>
<td>TOTAL</td>
<td>68</td>
<td>100%</td>
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</table>
Fig 7: classes of combination therapy.

Table 8: Route of Administration.

<table>
<thead>
<tr>
<th>ROUTE OF ADMINISTRATION</th>
<th>NO. OF DRUGS</th>
<th>PERCENTAGE</th>
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<tr>
<td>ORAL</td>
<td>64</td>
<td>16%</td>
</tr>
<tr>
<td>PARENTERAL</td>
<td>336</td>
<td>84%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>400</td>
<td>100%</td>
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In 150 drugs prescribed 16% was prescribed oral route and 84% was prescribed with parenteral route.
Fig 9: Route of Administration.

TABLE 9: Reason For Admission.

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>REASON FOR ADMISSION</th>
<th>NO. OF PATIENTS</th>
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<tr>
<td>1</td>
<td>BURNING MICTURITION</td>
<td>120</td>
<td>80%</td>
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<tr>
<td>2</td>
<td>FEVER</td>
<td>100</td>
<td>66%</td>
</tr>
<tr>
<td>3</td>
<td>FREQUENT URINATION</td>
<td>130</td>
<td>86%</td>
</tr>
<tr>
<td>4</td>
<td>ABDOMINAL PAIN</td>
<td>90</td>
<td>60%</td>
</tr>
<tr>
<td>5</td>
<td>DARK URINE</td>
<td>60</td>
<td>40%</td>
</tr>
<tr>
<td>6</td>
<td>FATIGUE</td>
<td>70</td>
<td>46%</td>
</tr>
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</table>

Fig 10: Reason For Admission.
Table 10: Prescription Comparison With Indian Guidelines.

<table>
<thead>
<tr>
<th>PRESCRIPTION STATUS</th>
<th>NO OF PRESCRIPTION</th>
<th>PERCENTAGE</th>
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<tr>
<td>RATIONAL PRESCRIPTION</td>
<td>123</td>
<td>82%</td>
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<tr>
<td>IRRATION PRESCRIPTION</td>
<td>27</td>
<td>18%</td>
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</table>

In 150 prescriptions 82% of the prescription was found to be rational and 18% irrational.

**Fig 11: Prescriptions Comparison with Indian Guidelines.**

**DISCUSSION**

- The result of our study suggest that UTI is more prevalent in Female patients (56%) than in male patients (44%).
- Our study shows that the age group of the patients included in the study ranged 1-100 years out of which 40.66% was aged 41-59 years, 26.66% was aged 61 - 79 years ,20% was aged 1-19 years. 10.66% was aged 20-29 years, and 2% was aged 81-100 years.
- In our analysis of treatment of UTI, we recognised that most patients require monotherapy to treat UTI, 55% of cases were treated with monotherapy and 45% were treated by combination therapy. In monotherapy Nitrofurantoin, Ciprofloxacin and Piperacillin are used.
- In the present study most preferred class of drug was Nitrofurantoin which is supported study done by Samira Kumar Naik et.al who found the similar result.
- Our finding, provide direct evidence that Nitrofurantoin antibiotics was prescribed as the first choice of treatment in 37% of the patients. The applications of the guidelines for the rationalisation of antibiotic use are essential in clinical practice.
In 150 prescriptions 6% of prescriptions had interaction among prescribed drugs while 94% prescriptions were without significant drug interaction.

In 150 prescriptions, 84% of antibiotics are administered in parenteral route while 16% were administered by oral route. This shows clearly that major route of administration of our study was parenteral.

The clinical symptoms in the studies cases was burning micturition (80%), fever (66%), frequent urination (86%), abdominal pain (60%), dark urine (40%), fatigue (46%), which indicates burning micturition was the most common symptom, that was similar to the findings of study conducted by Ramanath H et.al on prescription patterns of antibiotics.

In 150 prescription 82% of prescriptions were adhered with INDIAN guidelines while 18% were deviated.

CONCLUSION

A 18% deviation from guidelines was observed in the treatment was observed with respect to selection of antibiotic and reported to the study department and suggestions were given. No errors were observed with respect to route of administration. Around 6% prescription had DI and reported to the study department.

Hereafter, the total study we got to know that the drugs were rationally or irrationally prescribed.

Monotherapy was most used for the treatment of UTI.

In combination therapy dual therapy was most preferred than other combination therapy. The preferential class of drugs after assessing all the prescriptions most of the individual prescription contain Nitrofurantoin and Lincomycin were the least preferred.

Future Plan

Pharmacoeconomic evaluation studies can also be done.

In future a long-time study with a greater number of patients has to be carried out.

ACKNOWLEDGEMENT

As he is the first and last, we thankfully bow with the reverence before the Lord almighty who is the source of all wisdom and knowledge, the creator who by his heavenly blessing and abundant grace which strengthened as in each and every steps throughout this successful completion of this dissertation.
With greater pleasure and sense of gratitude, we thank our respected guide Dr. Sandra Sabu Assistant Professor at ABIPER for her valuable suggestion, guidance and support throughout project work. We express our sincere thanks to her for stimulated discussion, meticulous guidance unlimited support in all activities concerning our project.

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BIBLIOGRAPHY
List of Abbreviations

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<th>FULL FORM</th>
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<td>UTI</td>
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</tr>
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<td>WHO</td>
<td>WORLD HEALTH ORGANISATION</td>
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# Patient Profile Form

**ADITYA BANAGLORE INSTITUTE OF PHARMACY EDUCATION AND RESEARCH**  
**DEPARTMENT OF PHARMACY PRACTICE**  
#12 Kogilu Main Road, Yelahanka, Bangalore-64

## PATIENT PROFILE FORM

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### LABORATORY INVESTIGATION

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### DIAGNOSIS:

### DRUG TREATMENT CHART

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**DISCHARGE MEDICATION:**

**FOLLOW UP:**

**SIGNATURE OF STUDENT:**

**SIGNATURE OF STAFF:**

---

Data entry form use
Patient consent form

I have read / been briefed on A PROSPECTIVE STUDY ON PRESCRIBING PATTERN OF ANTIBIOTICS IN URINARY TRACT INFECTION IN A TERTIARY CARE HOSPITAL. B and I voluntarily agree to participate in the project. I understand that participation in this study may or may not benefit me. Its general purpose, potential benefits, possible hazards, and inconveniences have been explained to me up to my satisfaction. I have the option to withdraw from the study at any stage. I hereby giving my consent for this Study.

Name of the volunteer / patient Signature or thumb impression of Patient

Place:

Date:

Signature of Investigators