(RESEARCH ARTICLE)

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Prescribing pattern of antibiotic regimen in inpatients with uncomplicated urinary tract infection

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Abstract

Introduction: Uncomplicated urinary tract infection is among the more common infections in females. The S3 guideline contains recommendations based on current evidence for the rational use of anti - microbial agents and for the prevention of inappropriate use of certain classes of antibiotics and thus of the resulting drug resistance.

Methodology: A hospital based, prospective, observational type of study to be conducted in Inpatient department, Government general hospital, Kadapa, Andhra Pradesh. Study was conducted over a period of 6 months (September 2019 to Feb 2020).

Results: According to our study**,** patients with illiterate (26) were mostly affected when compared to literate (24), housewives were mostly affected with uUTI (44) with age group of 18-33 were mostly affected (23), 49-63 age group people were less affected with uUTI(8) . Cystitis was the mostly commonly seen in patients (43) when compare to pyelonephritis. Ceftriaxone was mostly commonly prescribed drug when compare to other antibiotics (27).

Conclusion: We found that majority of patients were treated with third- generation cephalosporine class of drug (ceftriaxone) followed by ciprofloxacin, nitrofurantoin.

Keywords: Uncomplicated urinary tract infections; Antibiotics; Ceftriaxone; *E. coli*

1. Introduction

Uncomplicated urinary tract infections (UTIs) are the most frequently experience infections, after respiratory tract infections, UTIs are the most common reason for prescribing antibiotics. Now the level of pathogenic resistance was risen significantly in uUTIs, but medical world was more awareness about the alternative effects of systemically applied antibiotics[1]. Acute dysuria, pollakiuria, pain, burning micturition, urgent urination and suprapubic tenderness without fever are the standard symptoms of acute uncomplicated UTIs (cystitis). 80% of urine specimens from patients shows the Escherichia coli strains which are the most common uropathogens causes lower acute uncomplicated uUTI (cystitis), followed by Staphylococcus saprophyticus and aerobic Gram-negative bacteria, (Klebsiella pneumoniae and Proteus mirabilis)[2,3]. Primary care guidelines recommended antibiotic treatment fast symptom resolution. There is few evidences for neither natural course of untreated uncomplicated UTI nor for alternative therapeutic options. Most of the women don't seek any medical help immediately but they try to wait or treat themselves for home remedies[4].

ABO-blood-group non secretor phenotype, sexual intercourse, use of a diaphragm with spermicide, delayed post coital micturition was the factors may influence the risk of UTI.[5] Recent international surveillance studies reveal the resistance of fluoroquinolones and trimethoprim-sulfamethoxazole in Community-acquired uropathogens. Uncomplicated cystitis in women nitrofurantoin is the first line therapy. In some cases where nitrofurantoin cannot used in UTI were having

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allergy, creatinine clearance < 40 mL/ min. In cases of pyelonephritis additional information is necessary for clinicians to prescribing effective empiric therapy[6]. Trimethoprim-sulfamethoxazole, nitrofurantoin, or Fosfomycin are the first line drug of choice in uncomplicated urinary tract infection (UTI) which is recommended by IDSA guideline[7]. Public Health England (PHE) recommends first line therapy for women with suspected uncomplicated UTI with drugs of nitrofurantoin, trimethoprim, or pivmecillinam(where resistance risk is higher)[8].

In Canada, *E. coli* resistance rate of trimethoprim–sulfamethoxazole was exceeded 20% threshold which guidelines recommend against TMP–SMX use for UTI treatment[9]. Women were the mostly effected by the UTI, 1 in 2 women were experienced the least 1 episode of UTI in their lifetime, in premenopausal women UTI were 50 times more common than in man[2]. In Netherlands the incidence rate in women age between 16-65 was 26 in 1000 inhabitants per year. Escherichia coli is the causative uropathogen in 80% of patient urine samples. According to the national guidelines of the Dutch College of General Practitioners (GPs), nitrofurantoin (first choice of drug) and trimethoprim (second choice of drug) with resistance of drug were 2% and 23%, respectively[3]. As per epidemiological surveys 11.3 million cases in the USA and 175 million cases worldwide can be estimated per year. Urine culture for pathogens test shows mostly 80% of cases positive with *E. coli*[10].

Other studies reveal 70–80% of uncomplicated UTI were caused by the causative agents *E. coli*. In past Trimethoprim, trimethoprim/sulfamethoxazole were the first line drug of choice in treatment of uncomplicated urinary tract infections with well-tolerated and cost-effective drugs to the patients. But Trimethoprim, trimethoprim/sulfamethoxazole drugs were no longer considered first-line treatments in UTI by the German clinical practice (S3) guideline published in 2010 but in revised version TMP was once again recommended as the first-line agent[11]. In USA estimated incidence of UTI in women over 18 years 12.6%. As per the data of ARMIN resistance- monitoring project in the German federal state of Lower Saxony ciprofloxacin resistance towards *E. coli* were increased from 10.3% to 14.7% in the past 10 years. The aim of updating the guideline is provide clinical practice recommendations for the diagnosis, treatment, and prevention of uncomplicated bacterial community-acquired UTI in adults[12].

Aim:

To study the prescribing pattern of antibiotic regimen in inpatients with uncomplicated urinary tract infection.

The key objectives of Study include

- To categorize the patients with uncomplicated UTIs, based on demographics
- To classify patients based on empirical treatment guidelines or prescribing pattern of antibiotics in management of uUTIs.
- To measure the outcomes of antibiotics based on length of stay and recurrence of uUTIs.

2. Material and methods

2.1. Study Design and Area

It is a prospective, observational type of study to be conducted in Inpatient department, Government general hospital, Kadapa.

2.2. Study Period

Study was conducted over a period of 6 months (September 2019 to Feb 2020).

2.3. Sample Size

A total of 80 subjects were collected.

2.4. Source of Data

Collected from treatment charts, case sheets and laboratory data of the subjects included in the study

2.5. Inclusion Criteria

- Those who are prescribed with antibiotics for uncomplicated urinary tract infections are included in this study
- Age (above 18yrs)
- Gender (female)

2.6. Exclusion Criteria

- Out patients
- Pregnant women
- Lactating women
- Complicated urinary tract infection
- Patients with uncomplicated urinary tract infection, but not treated with antibiotics

2.7. Method of Collection of Data

- Patients were selected from general medicine Inpatient department.
- Patient satisfying inclusion criteria were included in study.
- Patient data was collected and recorded in ANNEXURE-I: Patient data collection form.

2.8. Study Procedure

A total of 80 subjects were recruited during the study period and 30 subjects were excluded and remaining 50 subjects were included.

2.9. Statistical Analysis

- Microsoft excel was used to record the data of recruited subjects. All the graphs and tables were created using Microsoft excel.
- We used descriptive statistics like mean, median, standard deviation, paired T test was used to assess the demographic characteristics features of subjects included in the study.

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3. Results

A total of 80 subjects were included from September 2019 to febrauary2020, for a period of six months from inpatient department of general medicine. Total number of subjects Enrolled 80. In these ten subjects were excluded due to other co morbidities. Twenty subjects were excluded not prescribed by the medications.

3.1. Distribution of Subjects Based on Age Group:

Among 50 patients, subjects with age group 18-33 are mostly affected with uUTIs 23 (46%), followed by 34-48 age group with 19 uUTIs (38%), and less affected subjects were 49-63 age group with 8 uUTIs (16%).

3.2. Categorization of subjects with uUTI based on qualification:

Among 50 subjects, illiterate (52%) was predominantly affected with uUTI when compared to literate (48%).

S. No	Age	No. of subjects	Qualification	No. of subjects	Occupation	No. of subjects	Types of UTI and its symptom		No. of subjects
1.	18-33	23	Illiterate	26	Student	5	Cystitis	1.Dysuria (37)	43
								2.Frequent urination (5)	
								3. Suprapubic pain (1)	
2.	34-48	19	Literate	24	House wife	44	Pyelonephritis.	1. Fever, vomiting (5)	7
								2. Chills (2)	
3.	49-63	8			Others	1			

Figure 1 Categorization of subject based on Age, Gender, Occupation and types of UTI with its symptoms

3.3. Categorization of uUTI based on occupational groups

Among 50 patients, subjects with occupational group house wife are mostly affected with uUTI 44 (88%), followed by students with 5 uUTI (10%), and less affected subjects were others (farmer) with 1 uUTI (2%).

3.4. Categorization of uUTI based on Types of uUTI

Among 50 patients, subjects with cystitis are mostly affected 43(86%), and less affected subjects 7(14%) with pyelonephritis.

3.5. Categorization of subjects based on symptoms (cystitis)

Among 50 patients, 43sujects were with cystitis, subject with symptoms Dysuria are mostly affected 37(86%), followed by frequent urination with 5(12%), and less affected by suprapubic pain with 1(2%).

3.6. Categorization of uUTI based on symptoms (pyelonephritis)

Among 50patients, 7 subjects were affected with pyelonephritis, subjects with symptoms fever and vomiting are mostly affected 5(62%), and less are affected with symptoms chills 2(38%) were shown in Figure:1.

3.7. Categorization of uUTI based on risk factors

Among 50 patients, subjects with uUTI 44(88%), followed by risk factors diabetes 3(6%), followed by risk factor hypertension 3(6%). (shown in table. 1).

Table 1 Categorization of uUTI Based on Risk Factors

S no	Disease	No. of cases
1	uUTI	44
2	UTI, Diabetes	3
3	UTI, HTN	3
4	TOTAL NO.OF CASES	50

3.8. Categorization of UTI based on urine analysis:

Among 50 patients, subjects with pus cell 1 to 10 are mostly affected with uUTI 40(80%), subjects with pus cells occasionally are affected with uUTI 5(10%), subjects with pus cells plenty are affected with uUTI 5(10%). (Shown in table 2).

Table 2 Categorization of uUTI Based on Urine Analysis

Sno	No. of pus cells	No. of patients
1	1 to 10	40
2	Occasionally	5
3	Plenty	5

3.9. Categorization of uUTI based on utilization of drug

Among 50 patients, ceftriaxone drug was mostly utilized by the subjects 27(54%), followed by ciprofloxacin 11(22%), followed by Nitrofurantoin 9(18%), and less drug utilized or combination of both Nitrofurantoin and ceftriaxone 3(6%). (Shown in table 3).

Table 3 Categorization of UTI Based on Utilization of drug

Sno	Drugs	No. Of Patients
1	Nitrofurantoin	9
2	Ceftriaxone	27
3	Ciprofloxacin	11
4	Nitrofurantoin and Ceftriaxone	3

4. Discussion

Our clinical study was conducted on prescribing pattern of antibiotics regimen in inpatients with uncomplicated urinary tract infection in tertiary care teaching hospital in the inpatient department of general medicine. During this study period a total of 80 subjects were enrolled and 30 patients were excluded who met with exclusion criteria A total of 50 subjects were included. Among the recruited subjects, female patients between the age group of 34-40 having a higher incidence of uncomplicated urinary tract infection. Female patients between the age group of 57-63 having a lower incidence of uncomplicated urinary tract infections. Our results shown that uncomplicated urinary tract infection associated cystitis and pyelonephritis was seen in more than half of the subjects. In our study, cystitis and pyelonephritis based on treatment of ceftriaxone and ciprofloxacin alone and nitrofurantoin alone and combination of ceftriaxone and nitrofurantoin. The mostly prescribed medication was ceftriaxone and ciprofloxacin. Samira et al., study was similar to our study in which the ceftriaxone was the highest prescribed among the cephalosporins. [14]

Among 50 patients, subjects with age group 18-33 are mostly affected with uUTIs 23 (46%). illiterate (52%) was predominantly affected with uUTI when compared to literate (48%). Cystitis are mostly affected 86% in house wife are mostly affected with uUTI (44). We assessed the prescribing of the ceftriaxone was more when compared with the ciprofloxacin and nitrofurantoin. Our results identified that the mostly prescribed treatment was ceftriaxone. Ceftriaxone is a cephalosporin antibiotic and used treats many kinds of bacterial infections belongs to third class cephalosporin. We aimed at studying the prescribing pattern of antibiotic regimen in inpatients with uncomplicated urinary tract infections.

5. Conclusion

We conclude that categorization of patient with uncomplicated UTIs, based on demographics. Prescribing patterns of antibiotic regimen according to International clinical practice guidelines for the treatment of acute cystitis and pyelonephritis in women. The lengths of patients are minimum 4 days and not find any recurrence of UTIs .In this study area they follow the guidelines of American urological association or Canadian urological association. As per our study results, we conclude Ceftriaxone (cephalosporin) ciprofloxacin (fluoroquinolones) and nitrofurantoin (antibiotic) are good treatment option for uncomplicated urinary tract infection .

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

Informed that case studies consent was obtained from all individual participants included in the study of Prescribing pattern of antibiotic regimen in inpatients with uncomplicated urinary tract infection

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