EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH
www.ejpmr.com

A PROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE THE PRESCRIPTION PATTERN OF ANTIBIOTICS USING WHO INDICATORS IN PATIENTS WITH URINARY TRACT INFECTION

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ABSTRACT

UTI is an infection of the urinary tract which is commonly seen in females. Most of the infections are caused by bacteria and antibiotics are the drugs of choice. There are several other study literatures related to urinary tract infection. Most of the studies are mere epidemiological surveys and focus on the distribution pattern of UTI. The role of pharmacist and assessment of antibiotic prescribing pattern is limited. Our study focuses on evaluating the prescribion pattern of antibiotics. A prospective observational study was conducted in the department of General Medicine on 70 UTI patients prescribed with antibiotics. WHO prescribing indicators were used to assess the prescribing pattern of antibiotics. Study concluded that the prescribing pattern of antibiotics and rationality in prescribing is fairly appropriate and still need to be improved. Unnecessary polypharmacy needs to be avoided, prescribing by generic name need to be promoted and number of injections per prescription need to be reduced. It is hoped that the objectives of the study are met and will result in a better usage of antibiotics for UTI with lesser incidence of antibiotic resistanc.

KEYWORDS: UTI, Antibiotics, Prescribing pattern, Rationality in antibiotics, WHO prescribing indicators, Antibiotic resistance.

INTRODUCTION

A urinary tract infection can be defined as the presence of microorganisms in urine that cannot be accounted for by contamination. It can be infection in any part of your urinary system – kidney, ureter, bladder or the urethra. Most infections are in the bladder or urethra, but serious infections involve the kidney. Lower urinary tract infections are the most common type of UTI and is very common in women. The treatment is most antimicrobial agent based and needs clear evaluation.

Signs And Symptoms of Uti: Urinary tract infections don't always cause signs and symptoms, but when they do, they may include: a strong, persistent urge to urinate, burning sensation when urinating (dysuria), passing frequent, small amounts of urine, urine that appears cloudy, urine that appears red, strong-smelling urine, pelvic pain, in women, mild fever, chills, feeling ill, nausea and vomiting, poor appetite.

Complications of Uti: Infections, especially in women who experience two or more UTIs in a six-month period or four or more within a year, recurrent episodes of UTI, Permanent kidney damage from an acute or chronic infection, increased recurrent risk in pregnant women of delivering low birth weight or premature infants, urethral narrowing (stricture) in men from recurrent urethritis.

Types of Uti: Based on the site: Lower urinary tract infection (Urethritis, Cystitis, Vaginitis) and Upper urinary tract infection (Pyelonephritis). Based on the symptoms: Symptomatic UTI (signs and symptoms of UTI with laboratory tests confirming a bacteriuria of at least 1,00,000 CFU per ml) and asymptomatic UTI (no signs and symptoms of UTI but laboratory tests confirm a bacteriuria of at least 1,00,000 CFU per ml). Based on the complication: Complicated UTI (infection of the urinary tract leading to structural and functional abnormality) and Uncomplicated UTI (a normal infection without prior surgery or instrumentation).

Based on Occurrence: Relapse (recurrence of bacteriuria with the same organism within 7 days of completion of antibacterial treatment), Reinfection (bacteriuria is absent after treatment for at least 14 days, followed by recurrence of infection with the same or different organism).

Pathophysiology: The bacteria that cause urinary tract infections typically enter the bladder via the urethra. However, infection may also occur via the blood or lymph. It is believed that the bacteria are usually transmitted to the urethra from the bowel, with females at greater risk due to their anatomy. After gaining entry to the bladder, *E.coli* are able to attach to the bladder wall and form a biofilm that resists the body's immune response.
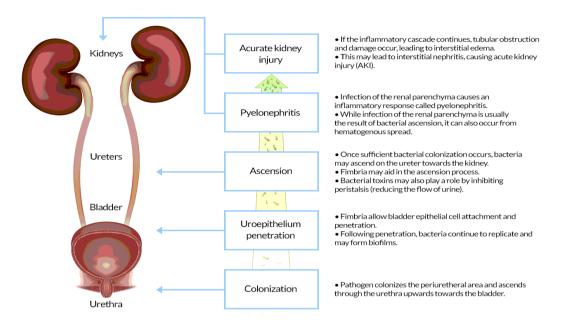
Pathogenesis of urinary tract infection

Acurate kidney injury
- If the inflammatory cascade continues, tubular obstruction and damage occur, leading to interstitial edema.
- This may lead to interstitial nephritis, causing acute kidney injury (AKI).

Pyelonephritis
- Infection of the renal parenchyma causes an inflammatory response called pyelonephritis.
- While infection of the renal parenchyma is usually the result of bacterial ascension, it can also occur from hematogenous spread.

Ascension
- Once sufficient bacterial colonization occurs, bacteria may ascend on the ureter towards the kidney.
- Fimbria may aid in the ascension process.
- Bacterial toxins may also play a role by inhibiting peristalsis (reducing the flow of urine).

Uroepithelium penetration
- Fimbria allow bladder epithelial cell attachment and penetration.
- Following penetration, bacteria continue to replicate and may form biofilms.

Colonization
- Pathogen colonizes the periuretheral area and ascends through the urethra upwards towards the bladder.

Fig no. 1: pathogenesis of Urinary Tract Infection.

Etiology: The vast majority of urinary tract infections (UTIs) are caused by the bacteria like E.coli, Klebsiella pneumonia and less by fungi like Candida albicans, virus like Adenovirus and other microorganisms. Urinary tract infections are common in women, and many women experience more than one infection during their lifetimes. Other risk factors include urinary tract abnormalities, blockages in the urinary tract, a suppressed immune system, catheter use, a recent urinary procedure etc.

Diagnosis: Tests and procedures used to diagnose urinary tract infections include: urine dipstick test, analyzing urine, growing urinary tract bacteria in a lab creating images of your urinary tract, using a scope to see inside your bladder.

Prevention of Uti: drink plenty of liquids, especially water, drink cranberry juice, wipe from front to back, empty your bladder soon after intercourse, avoid potentially irritating feminine products, change your birth control method.

Non Pharmacological Management: keep yourself hydrated, urinate when the need arises, drink cranberry juice, use probiotics, get enough vitamin C, use cucumber daily, drink diluted apple cider vinegar on empty stomach.

Pharmacological Treatment: Minor cases of UTI are self-limiting and can be treated non pharmacologically. Others require antibiotic therapy. The goals of antimicrobial therapy are: Eradicate the invading organism, choose the specific antibiotic, improve the symptoms of UTI, prevent further complications, prevent recurrence of UTI.

Prescription Pattern Monitoring Studies (Ppms): are the drug utilization studies with the main focus on prescribing, dispensing and administration of drugs. They promote appropriate use of monitored drugs and reduction of abuse and misuse. It also guide and support prescribers, dispensers and the general public on appropriate use of drugs, collaborate and develop working relationship with other key organizations to achieve a rational use of drugs. Prescription pattern explains the extend and profile of drug use, trends, quality of drugs and compliance with regional, state and national treatment guidelines, usage of drugs from essential drug list and use of generic drug names.

MATERIALS AND METHODS
- **Study Design:** Prospective observational study.
- **Study Site:** Tertiary care setting.
- **Inclusion Criteria:** In-patients receiving antibiotic for UTI in the department of General Medicine, both male and female, age group 18 to 80 years, those who give consent voluntarily to participate in the study.
- **Exclusion Criteria:** Out-patients, pregnant and lactating women, patient who are not willing to give consent.
- **Study Procedure:** A prospective observational study was conducted in the department of General Medicine on the topic *'A prospective observational study to evaluate the prescription pattern of antibiotics for safety, effectiveness and rationality in patients with Urinary Tract Infection'*. The selection of patients was based upon the inclusion and exclusion criteria. All patients will be given a brief introduction about the study and the confidentiality of the data. A written informed consent form will be obtained from the patient or care giver. Patients with UTI and on antibiotic were identified. The prescriptions of patients were analyzed for drugs prescribed, drug interaction and antibiotic susceptibility. Patient demographic data, drug therapy and culture sensitivity test (if available) collected on a patient data collection form. Prescribing pattern of drugs were collected from the medical records and assessed using WHO prescribing indicators.

RESULT AND DISCUSSION

Table no.1: WHO prescribing indicators value obtained.

Total no. of prescription analyzed	70
Total no. of drugs	680
Average no. of drugs per prescription	7.71
Percentage of drugs prescribed by generic name	31.11%
Percentage of encounters with an antibiotic prescribed	13.08%
Percentage of encounters with an injection prescribed	27.94%
Percentage of drugs prescribed from formulary	100%

Table no.2: WHO prescribing indicators reference range.

Name Of The Indicator	Who Reference Range
Average number of drugs per prescription	<2
Percentage of drugs prescribed by generic name	100%
Percentage of encounters with an antibiotic prescribed	<30%
Percentage of encounters with an injection prescribed	<20%
Percentage of drugs prescribed from EDL or formulary	100%

From WHO prescription indicator analysis, it is quite evident that the tendency towards polypharmacy is high and the average number of drugs per prescription is high. Increased number of drugs per prescription increases the risk of ADR and number of drug interactions. The number of antibiotic prescribed is within the normal range as per the WHO reference range and no antibiotics are prescribed simultaneously to a single patient. Prescribing drugs by its generic name need to be promoted by a great extend as it can help reduce medication errors. All the drugs are prescribed from Hospital formulary which is highly appreciable. The number of injections per prescription can also be reduced to a less extend which can help to improve cost effectiveness and patient compliance

CONCLUSION
UTI is a common bacterial infection affecting all population especially women. Antibiotic treatment for UTI is often empirical based on physician's comfort and experience. As the number of UTI patients are increasing in the current scenario this study is an attempt to evaluate the prescription pattern of antibiotics. The study was conducted in the General Medicine Department of a tertiary care hospital. 70 in-patients of the age group 18 to 80 years of all gender receiving antibiotic for urinary tract infection was chosen for the study. Prescriptions of all the patients were analyzed and data collected which was evaluated on the basis of WHO prescribing indicators.

According to the WHO prescribing indicator analysis, the average number of drugs per prescription was high. As there is a tendency towards polypharmacy in our hospitals, especially with elder population who have other comorbidities, educational interventions towards improving prescribing patterns are required. Although the prescribing pattern of antibiotics are fairly appropriate, intravenous administration of the drugs or injections per prescription has to be reduced. Prescribing in generic names should also be improved in our hospitals which can prevent medication errors and further adverse effects.

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