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A BROAD SURVEY AND COMPREHENSIVE STUDY ON UTILIZATION PATTERN OF ANTIBIOTICS IN TERTIARY CARE TEACHING HOSPITAL IN NORTH KARNATAKA

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ABSTRACT: An ongoing, systematic process designed to maintain the appropriate and effective use of drugs is Drug Use Evaluation (DUE). It involves a comprehensive review of patient's prescription and medication data before, during, and after dispensing in order to assure appropriate therapeutic decision making and positive patient outcomes. The aim of the present study is to conduct a prospective study on utilization pattern of antibiotics in the department of medical teaching hospital situated in North Karnataka to evaluate the rational use of antibiotics, by comparing with the standard Clinical guidelines. The study is a Prospective observational with a sample size of 250 patients conducted using structured data entry forms. In our study, 155 patients were male and 95 were female. The most commonly used class of antibiotics are Cephalosporins (31.2%) preceded by Fluoroquinolones and Azoles. Penicillin's were also prescribed for most of the infectious diseases. The duration of hospital stay is for more than 7 days with prolonged use of antimicrobial agents which does not provide an additional therapeutic benefit while the cost and the adverse effects simultaneously escalate. In comparison with the standard guidelines, deviations and under practice of diagnosis and treatment was observed. It is concluded from the present study that, though there is successful combat of infection using antimicrobial agents it is desirable to adopt treatment protocol to increase the success rate. Pharmacists involved in DUE programs can directly improve the quality of health care of patients.

INTRODUCTION: DUE is an ongoing, systematic process designed to maintain the appropriate and effective use of drugs [1]. It involves a comprehensive review of patient's prescription and medication data before, during, and after dispensing in order to assure appropriate therapeutic decision making and positive patient outcomes [2]. Pharmacists participating in DUE programs can directly improve the quality of care for patients, individually and as populations, by preventing the use of unnecessary or inappropriate drug therapy and by preventing adverse drug reactions.

Antimicrobial agents play a pivotal role in the management and control of infectious diseases and in the decrease of infectious disease related mortalities. But now days the evolution of drug resistant organisms has greatly impaired their therapeutic efficacy.

Inappropriate and irrational use of antimicrobial medicines provides favorable conditions for resistant microorganisms to emerge, spread and persist in resistant forms [3].

Example of these circumstances include use of antibiotics when there is no evidence of infection, administration of antibiotics to patients who are colonized with an organism, inappropriate surgical prophylaxis (including inappropriate dose, dosing interval, and treatment duration before and after surgery), administration of antibiotics for treatment of infection with microorganisms that are resistant to those antibiotics, administration of broad-spectrum antibiotics when narrower-spectrum antibiotics would have been effective and available, administration of multiple antibiotics that have a redundant spectrum, administration of antibiotics that are inadequate for the microorganisms that cause the disease, and administration of antibiotics with inappropriate doses and treatment durations [4].

The current worldwide increase in antimicrobial resistance (AMR) and, simultaneously, the downward trend in the development of new antibiotics have serious public health and economic implications.[5]It is estimated that 20-50% of all antibiotics use is inappropriate, resulting in an increased risk of side effects, higher costs and higher rates of AMR in community pathogens. Detailed surveillance of antibiotic use in the community is one strategy to guide and control antibiotic overuse and misuse.[6] Hence, in the present work an attempt is being made to evaluate the utilization pattern of antimicrobials to promote rational use of antibiotics.

MATERIAL AND METHODS: It is a Prospective observational study carried out in 250 patients who were prescribed with antibiotics in General Medicine, Pediatric, OBG, Orthopedic and Surgery wards of a tertiary care hospital. Whereas Patients who were prescribed with antibiotics in casualty and ICU were excluded. Data were collected using a predesigned proforma. It includes demographic details, family history, medical history, laboratory investigations, diagnosis, categories of drug prescribed, drug interactions, adverse drug reactions.

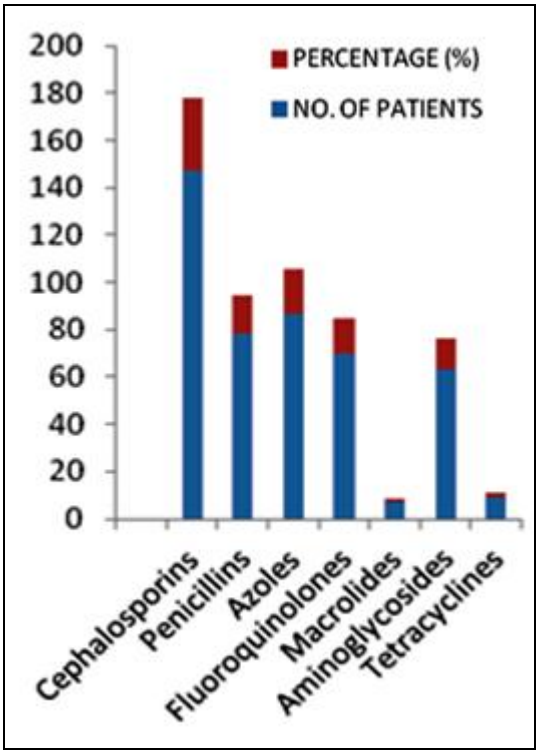
RESULT AND DISCUSSION: In our study, male patients were predominant and age <20 years were found to be high. The most commonly used class of antibiotic was Cephalosporins. The increasing trend towards the use of one Antimicrobial agent is an indication of improved prescribing skills on the part of clinicians and the availability of effective Antimicrobial agent with wide spectrum activity.

The higher percentage of single antimicrobial agent used is with Fluoroquinolones is related to the affordability by patients in private hospitals. In contrast, two Antimicrobial agents (Azole antibiotic and Penicillins) was prescribed maximally in 20% of cases (**graph 1**).

The choice of Antimicrobial agent depends upon the type of infection, its severity and availability of Antimicrobial agent, efficacy, safety profile and cost.

The use of beta lactam antibiotics in this study (73.6%) was higher when compared to other antibiotics. Among the beta-lactams used, the cephalosporins were found to be 31.2% (cefotaxime-28.5%, ceftriaxone-55.7%, cefixime-13.6%, and cefuroxime 2%); Penicillins were found to be 16.5% (Amoxicillin + Clavulanic acid-34.6%, Piperacillin + Tazobactum-7.8%, Ampicillin + sulbactam-64.1%). The nitroimidazoles (18.4%) was the second commonest class of Antimicrobial agent prescribed in this study.

It is prescribed for indications like acute gastroenteritis, LRTI, gestation, appendicitis, pelvic inflammatory disease, white discharge per vagina, anaemia, hydrocele, vaginal hystectomy & Alcoholic liver disease.



GRAPH 1: ANTIBIOTICS PRESCRIBED TO THE STUDY POPULATION

The main objective of the study was to compare the treatment of different diseases with standard clinical guidelines. Deviations were observed in treatment guidelines as well as in differential diagnostic tests for particular diseases were not performed (**Table 1**).

TABLE 1: COMPARISON OF GUIDELINES FOR DIFFERENT DIAGNOSIS

DISEASE	GUIDELINES	DEVIATIONS REPORTED	INFERENCE	NO.OF CASES	%
Bronchitis	➢ Sputum characteristics should be performed	Not practiced	Under use	4/4	100
	➢ Drug of choice Macrolide antibiotic a) Clarithromycin for 7d b) Erythromycin for 14 d c) Azithromycin for 5d	Not always Practiced	Under use	3/4	75
Pneumonia	➢ Sputum characteristics should be performed	Not practiced	Under use	1/4	25
	➢ Vital signs and Respiratory rates to be found	Always Practiced	Optimal use	4/4	100
	➢ Chest radiography	Not always Practiced	Under use	1 /4	25
	➢ Drug of choice • PAEDIATRICS: Ampicillin + Gentamycin *Or* Amoxicillin + ceftriaxone	Always Practiced	Optimal use	4/4	100
	• ADULTS: Amoxicillin *Or* Amoxicillin + clavulanate *Or* Chloramphenicol	Not always Practiced	Under use	2/4	50
Asthma	➢ Antibiotics are not indicated	Not practiced	Under use	1/1	100
Pulmonary tuberculosis	➢ Sputum smear microscopy should be performed	Not practiced	Under use	9/9	100
	➢ Chest X-ray	Not always Practiced	Under use	1/9	11
	➢ Antibiotics not indicated, only RNTCP regimen to be given	Not practiced	Under use	9/9	100
COPD	➢ Antibiotic treatment in Exacerbations of COPD include β-Lactum antibiotics, tetracyclines, macrolides, cephalosporins, Flouroquinolones etc.	Always practiced	Optimal use	14/14	100
	➢ PFT, Spirometry, FEV tests to be performed.	Not always Practiced	Under use	14/14	100
Pharyngitis	➢ Drug of choice- Penicillin V, Penicillin G, Amoxicillin, Oral cephalosporins, Clindamycin and macrolide antibiotics	Always practiced	Optimal use	2/2	100

Gastroenteritis	➢ Prompt replacement of fluid and electrolyte loss by rehydration therapy. ➢ Zinc sulphate is to be administered in children <5years as a part of rehydration therapy. ➢ Antiemetics and Anti diarrhoeals should not be administered. ➢ Drug of choice: Doxycycline + Azithromycin	Always practiced Not practiced Not always practiced Not practiced	Optimal use Under use Under use Under use	14/14 14/14 8/14 14/14	100 100 57 100
Malaria	➢ Diagnostic Criteria: a) Blood microscopy should be performed to identify the species and quantification. b) Hb level c) Blood glucose level ➢ Drug of choice is Chloroquine alone	Not practiced Not practiced	Under use Under use	2/4 4/4	50 100
Meningitis	➢ Diagnostic Criteria: a)Examination of CSF Microscopic examination a)Gram staining and WBC count b)Appearance of CSF Drug of choice in child >5yrs include Ceftriaxone 100mg *or* Ampicillin 300mg	Not always practiced Not always practiced	Under use Under use	3/5 3/5	60 60
Typhoid Fever	➢ Diagnostic Criteria: a)WBC count b)Blood culture and stool culture c) Widal test Drug of choice a) Ciprofloxacin for 7d *or* b) Cefixime for 7d *or* c) Amoxicillin for 14d *or* d) Chloramphenicol for 14d	Not always practiced Not always practiced	Under use Under use	1/1 1/1	100 100
Viral Hepatitis	➢ Vaccination should be given. Antibiotics and corticosteroids are not indicated.	Not practiced Not practiced	Under use Under use	2/2 2/2	100 100
Fever	Paracetamol and Ibuprofen were indicated and no antibiotics should be given.	Not always practiced	Under use	16/16	100
Pyelonephritis	Drug of choice a) Ciprofloxacin for 7d *or* b) Cefixime for 10d	Always practiced	Optimal use	1/1	100
Abnormal Vaginal discharge	Drug of choice for Bacterial vaginitis: a)Metronidazole 400 mg po bid for 7d 200 mg po tid for 7d 2 g po as a single dose *or* b)Clindamycin 300 mg po bid for 7d	Always practiced	Optimal use	2/2	100
Pelvic Inflammatory	Drug of choice Cefoxitine 2g IV TDS	Not always practiced	Under use		75

Disease (PID)	*and* Doxycycline 100mg PO BD *followed by* Doxycycline 100 mg PO BD *and* Metronidazole 400mg PO BD.			3/4	
Hypertension, Heart failure, Seizures, DM	Antibiotics are not indicated	Not practiced	Over use	25/25	100
Iron-Deficiency Anemia	A combination of Iron supplement, Folic acid and antihelminthic should be indicated	Not always practiced	Under use	4/11	37
Hernia Appendicitis	Antibiotics are not indicated	Not practiced	Over use	28/28	100

In comparison with the standard guidelines, many deviations and under practice of diagnosis and treatment was observed. Sputum characteristics were not performed for pneumonia, bronchitis, pulmonary tuberculosis, and COPD. Without sputum analysis antibiotics has been prescribed for asthma.

In COPD and pharyngitis, the first choice of antibiotics has been prescribed. Proper rehydration with zinc sulphate is not practiced for gastroenteritis in children. The drug of choice in gastroenteritis is a combination of Doxycycline and Azithromycin, which is underused in our clinical setting.

CONCLUSION: From the study it is concluded that, though there is successful combat of infection using Antimicrobial agents in the study population, it is desirable to adopt treatment protocol to increase the success rate. Adhering to the standard guidelines for treatment will decrease antibiotic resistances and also helpful in achieving National goal of Pharmacoeconomics.

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