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Research Article

**ASSESSMENT OF GUIDELINE ADHERENCE AND
UTILIZATION PATTERN OF BETA LACTAM ANTIBIOTIC
AMONG ADULTS IN A TERTIARY CARE HOSPITAL IN
CALICUT**¹Theertha N. P., ²Vishnu P., ³Eliza Andrews, ⁴Sanjay Sreekumar K.^{1,2,3}Pharm D Interns, ⁴Associate Professor, Department of Pharmacy Practice, Devaki Amma Memorial College of Pharmacy, Malappuram, South India.**Article Received:** March 2023**Accepted:** April 2023**Published:** May 2023**Abstract:**

Background: Antimicrobial resistance is a global health and development threat. Thus it is necessary to define prescribing pattern and to identify the irrational prescribing habits based on guideline to derive a remedial message to prescribers. This study was taken to analyze the prescribing pattern of Beta- Lactam antibiotics and it's adherence to national guidelines.

Method: Retrospective observational study was carried out for a period of 6 months. The necessary data were collected from patient medical records and the findings were evaluated against the criteria prepared from standard treatment guidelines.

Results: Among 100 patient prescriptions studied 57 (57%) received monotherapy, 43 (43%) received combination therapy of antibiotics. While evaluating the use of monotherapy drugs, penicillin 27 (47.36%) was the most commonly used drug followed by cephalosporin 25 (43.85%) and Carbapenam 5 (8.77%). This study confirms that in non-adherent therapy 38 (66.6%) patients received wrong drug, 4 (7.01%) wrong duration, 7 (12.2%) wrong frequency and 8 (14.05%) received wrong dose.

Conclusion: Only 43 patient's prescriptions followed guideline therapy for antibiotic utilization. The overall prescribing pattern of antibiotics was not in fair compliance with National Guidelines. An intervention based on the latter is to implemented and since it is antibiotic related a reevaluation after a period of three months would be advisable.

Keywords: Antibiotics, Beta Lactam, Utilization pattern, National guidelines

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INTRODUCTION:

Antibiotics are medicines that fight bacterial infections in people and animals. They work by killing the bacteria or by making it hard for the bacteria to grow and multiply [1]. Penicillin's are the most commonly used broad-spectrum antibiotics by many clinicians, including primary care providers, internists, infectious disease experts, and nurse practitioners. Human antibiotic consumption in India is among the highest in the world [2]. Antibiotic consumption in India increased from 3.2 billion DDDs (defined daily doses) in 2000 to 6.5 billion. Although Beta-Lactams use is very common, their effective prescription requires an interprofessional team approach for optimal patient outcomes. Thus it is necessary to define prescribing pattern and to identify the irrational prescribing habits based on guideline to derive a remedial message to the prescribers. In the study conducted by *Janicke Sletti Wathne et.al*; on the association between adherence to national antibiotic guidelines and mortality readmission and length of stay in hospital inpatients concluded that adhering to antibiotic guidelines when treating infections in hospital inpatients was associated with favorable patient outcomes in terms of mortality and length of stay. The present study was done to analyze the prescribing pattern of β - Lactam antibiotics and it's adherence to national guidelines.

METHODOLOGY:

The study was conducted in PVS Hospital (P) Ltd, a 350 bedded multi specialty hospital in Calicut, Kerala. This study was a retrospective observational drug use evaluation using patient medical records. The necessary data were collected from patient medical records and entered into the well-designed data collection forms and then result was evaluated against the criteria prepared from the standard

treatment guidelines. Study was carried out for a period of 6 months from January 2022 to June 2022 using the medical records from January 2016-January 2022. The materials used for the study were case sheets of both inpatients and outpatients with infectious diseases mentioned in National Guidelines. Some clinical and therapeutic data such as diagnosis, comorbidities, past medical history, laboratory investigation parameters, and medication order and Beta lactam drugs were extracted from the case file of patients. From that data prescription pattern followed in the hospital were assessed.

Based on patient data collected and National Treatment Guidelines of Antimicrobial Use in Infectious Disease (version 1.0-2016) the treatment plan of patient is identified then patient's actual prescription was analyzed and checked for guideline adherence. This study was approved by the Institutional Ethics Committee, PVS Hospital (P) Ltd, Calicut during the conduct of the study

RESULTS:

A total of 100 prescriptions containing Beta Lactam antibiotics were collected and studied. The mean age for the patients was 39.74 \pm 11 years; among them 53% were females and 47% were males. Overall 57% received monotherapy and 43% received combination therapy of antibiotics. In case of monotherapy, penicillins 27 (47.36%) were the most commonly used drug followed by cephalosporin 25 (43.85%), and carbapenem 5 (8.77%). This may be due to better infection control efficacy of penicillin over cephalosporin. Among the combination therapy regimen amoxicillin + clavulanic acid 23 (53.4%) was the most commonly prescribed, followed by cefoperazone + sulbactam 16 (37.20%) and piperacillin+ tazobactam 4 (9.30%).

Table No. 1: Prescribing pattern of Beta Lactams

Prescribing pattern	Antibiotics	Number	Percentage
Monotherapy (57)	Penicillins	27	47.36%
	Cephalosporins	25	43.85%
	Carbapenems	5	8.77%
Combination therapy (43)	Amoxicillin + Clavulanic acid	23	53.4%
	Cefoperazone + Sulbactam	16	37.20%
	Piperacillin+ Tazobactam	4	9.30%

Among 100 prescriptions 43% received therapy as per National Guideline and 57% received empirical therapy. In non-adherent therapy 38(66.6%) patients received wrong drug, 4 (7.01%) wrong duration, 7 (12.2%) wrong frequency and 8(14.05%) received wrong dose.

Table No. 2: Prescription as per National Guideline

Prescribing pattern		Number	Percentage
National Guideline		43	43%
Empirical Therapy (57%)	Wrong drug		66.6%
	Wrong duration		7.01%
	Wrong frequency of administration		12.2%
	Wrong dose		14.05%

Among 100 prescriptions 43% received therapy as per National Guideline and 57% received empirical therapy. In non-adherent therapy 38(66.6%) patients received wrong drug, 4 (7.01%) wrong duration, 7 (12.2%) wrong frequency and 8(14.05%) received wrong dose.

In studies of Dawit Kumilachew Yimenu *et.al.* [3] penicillins were the most frequently prescribed drugs whereas in a study by Maliha Ata *et. al.* [4] cephalosporin were the most frequently prescribed monotherapy followed by penicillin. In the present study penicillins (47.36%) were the most commonly prescribed monotherapy for infectious diseases followed by cephalosporins (43.85%). A combination of penicillin and β lactamase inhibitor were the most commonly prescribed drug combination and penicillin were used more often as a component of combination therapy, this findings were similar to that of study by Shen-Peng *et. al.* [5] According to National Treatment Guideline for Antimicrobial use in Infectious diseases version 1.0 generally recommended Penicillin + β lactamase inhibitor as the first line treatment for most of the infectious disease. In another study by Evans J. *et. al.* [6] it was clearly mentioned that idiosyncratic drug induced hepatic injury is one of the common reasons for resistance to infectious disease treatment.

CONCLUSION:

This retrospective observational study on assessment of guideline adherence and utilization pattern of β lactam antibiotics confirmed that most the antibiotics prescriptions were not adhering with The National Treatment Guidelines for Antimicrobial Use in Infectious Diseases version (1.0). While assessing the prescription pattern for infectious diseases it was confirmed that monotherapy was prescribed more compared to combination therapy. Penicillins were the most frequently prescribed drug class followed by Cephalosporins and β lactamase inhibitors and carbapenem. When considering combination therapy the most commonly prescribed drugs were Penicillin and β lactamase inhibitor.

Among 100 patients, 43 patients follow guideline therapy. This study confirms that In non-adherent

therapy 38(66.6%) patients received wrong drug, 4(7.01%) wrong duration, 7(12.2%) wrong frequency and 8(14.05%) received wrong dose. This means Overall prescription patterns were not in fair compliance with National Guidelines and have a room for further improvement. Different strategies like continuous medical education seminars reminder tools and the availability of clinical pharmacist to participate in the collaborative practices and motivating patients to participate in infection control goal achievement via proper use of β lactam antibiotics could increase guideline adherence, infection control and minimizing the risk for rising level of antibiotic resistance.

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