

RESEARCH ARTICLE

PHARMACOLOGY

**PRESCRIPTION ANALYSIS TO EVALUATE RATIONAL USE OF
ANTIMICROBIALS**

HANMANT AMANE* AND PRIYADARSHINI KOP.

Department of Pharmacology, SDM College of Medical Sciences and Hospital, Dharwad, Karnataka,
India.



HANMANT AMANE

Department of Pharmacology, SDM College of Medical Sciences and Hospital, Dharwad,
Karnataka, India.

*Corresponding author

ABSTRACT

One of the most important problems encountered by healthcare system is the increasing prevalence of antimicrobial resistance. It may result from irrational or inappropriate use of antibiotics. The present study was undertaken to screen rational use of antimicrobials in outpatient department (OPD). Prescriptions from medicine, surgery, obstetrics and gynecology (OBG) and pediatrics OPDs were collected over a period of two months. Prescriptions containing antimicrobial drugs were analyzed for appropriateness in dosage, duration of therapy, and fixed dose drug combinations (FDCs). The maximum number of antimicrobial FDC prescriptions (52.17%) was found in surgery OPD as compared to other three departments, of which 75% FDC prescriptions were irrational, whereas in OBG OPD all four FDC prescriptions were irrational. Out of total FDCs from all the departments, 62.79% FDCs were irrational. It is the need of the time doctors should be made aware of the demerits of irrational prescribing and they should refrain from prescribing irrational FDCs.

KEYWORDS

Antimicrobials, outpatient department, rational.

INTRODUCTION

Rational use of drugs is based on use of right drug, right dosage at right cost which is well reflected in the world health organization (WHO) definition: "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community."¹ Antimicrobial drug resistance refers to non-responsiveness of micro-organisms to an antimicrobial agent. It can be intrinsic or acquired. Acquired resistance develops due to widespread and irrational use of antimicrobials. Antimicrobial drug resistance is a growing problem and developing new antimicrobials is not the solution for this problem.² It is the responsibility of the doctors to develop a good prescribing habit which will help in reducing the intensity of the problem. Some of the common causes that contribute to the development of antimicrobial resistance are unnecessary use of antimicrobial drugs, inappropriate dose, inadequate duration of therapy, use of irrational antimicrobial fixed dose drug combinations (FDCs).³ Because of high level of community antimicrobial drug resistance the use of expensive drugs becomes mandatory which may not be affordable by majority of patients in developing countries like India. Another problem is many of the second and third line agents are becoming ineffective in clinical practice. And as it is reported earlier, 'the slow pace with which new molecules of antimicrobials are introduced into the market is inadequate to meet the needs of this global threat'.⁴ To tackle with this problem, global initiatives are trying to promote "antibiotic stewardship," with the aim of enhancing the appropriateness of antimicrobial use. But it requires continuous education of prescribers and patients, which needs to be supported by high quality evidence linking antimicrobial use to the

emergence of resistance.⁵ In view of all these issues associated with drug prescribing, the present study was conducted to delineate the prevailing prescribing practices and to know the extent of rational therapy in outpatient setup.

MATERIALS AND METHODS

A retrospective study was carried out at a tertiary care hospital at Dharwad. An ethical clearance was obtained from institutional ethics committee. 400 prescriptions, 100 each from medicine, surgery, obstetrics and gynecology (OBG) and pediatrics OPDs were collected over a period of two months to evaluate the prescriptions for their rational approach. The prescriptions included in the study were from qualified doctors. Prescriptions containing antimicrobials of any category were selected randomly irrespective of ailments, age or sex of the patients or the route of administration of the drug. The antimicrobials studied were from the prescriptions made for common ailments like infections of upper and lower respiratory tract, urinary tract, gastro-intestinal tract and of soft tissues.

Mode of Collection of Prescriptions

The copies of the prescriptions from the patients attending OPD at a tertiary care hospital were obtained.

Rationality of the Prescription

In the present study, WHO guidelines were taken into consideration for evaluating the rationality of the prescriptions.^{1, 6, 8} The parameters for evaluation were: (1) Dose strength and dosage schedule (2) Duration of therapy (3) FDCs: rational or irrational.

RESULTS

Out of total 400 prescriptions collected from medicine, surgery, OBG and pediatrics OPDs, 33.75% prescriptions contained

antimicrobial drugs. Of which 52.59% prescriptions were with single antimicrobial agent, 15.55% prescriptions were with two or more antimicrobial agents and 31.85% prescriptions contained FDCs. (Table1)

TABLE 1
Analysis of prescriptions collected from respective departments.

| Parameter | Surgery (100) | Medicine (100) | OBG (100) | Pediatrics (100) |
|---|---------------|----------------|-----------|------------------|
| Antimicrobial prescriptions | 46 | 23 | 20 | 46 |
| Single antimicrobial agent | 19 | 17 | 07 | 28 |
| Antimicrobial combinations (excluding FDCs) | 03 | 01 | 09 | 08 |
| Antimicrobial FDCs | 24 | 05 | 04 | 10 |

Among the different classes of antimicrobial FDCs quinolones and nitroimidazoles remained the most frequently prescribed combinations followed by amino-penicillin combinations. (Table2)

TABLE 2
Most commonly prescribed irrational FDCs.

| FDCs | Surgery(18) | Medicine(04) | OBG(04) | Pediatrics(01) |
|-------------------------------|-------------|--------------|---------|----------------|
| Tab. Norfloxacin+Tinidazole | 01(5.55%) | 01(25%) | 01(25%) | 00(0%) |
| Tab. Ofloxacin+Ornidazole | 01(5.55%) | 00(0%) | 00(0%) | 00(0%) |
| Tab. Ciprofloxacin+Tinidazole | 04(22.22%) | 01(25%) | 01(25%) | 01(100%) |
| Tab. Gatifloxacin+Ornidazole | 03(16.66%) | 00(0%) | 00(0%) | 00(0%) |
| Cap. Amoxicillin+Cloxacillin | 04(22.22%) | 01(25%) | 01(25%) | 00(0%) |
| Cap. Ampicillin+Cloxacillin | 05(27.77%) | 01(25%) | 01(25%) | 00(0%) |

In the present study, we did not come across any prescription with incorrect dosage, incorrect duration of therapy, over prescribing or use of banned drug formulations.

The maximum number of antimicrobial FDC prescriptions (52.17%) was found in

surgery OPD as compared to other three departments, of which 75% FDC prescriptions were irrational. In OBG OPD, all the four prescriptions contained irrational FDCs. Lowest number of irrational FDC prescriptions (10%) was found in pediatric OPD. (Table 3)

TABLE 3
Evaluation of rationality of the prescriptions

| Parameter | Surgery (24) | Medicine (05) | OBG (04) | Pediatrics (10) |
|-----------------|--------------|---------------|----------|-----------------|
| Rational FDCs | 06(25%) | 01(20%) | 00(00%) | 09(90%) |
| Irrational FDCs | 18(75%) | 04(80%) | 04(100%) | 01(10%) |

DISCUSSION

Inappropriate and indiscriminate use of antimicrobials and their combinations is a global problem causing a substantial economic burden on health care systems. Over prescribing is associated with increased side effects, excessive cost of the therapy, moreover it leads to emergence of resistant organisms, whereas under prescribing gives rise to treatment failure.^{9,10,11,12}

Antimicrobial drug resistance refers to non-responsiveness of micro-organisms to an antimicrobial agent. One important reason for antimicrobial drug resistance is irrational use of FDCs. The present study was undertaken to evaluate rational use of antimicrobial FDCs in OPD of a tertiary care hospital.

In the present study, out of the total 400 prescriptions collected from surgery, medicine, OBG, and pediatrics OPDs, 33.33% prescriptions contained antimicrobial agents. It was also found that there was a trend towards prescribing antimicrobial FDCs for common ailments like infections of upper and lower respiratory tract, urinary tract, gastro-intestinal tract and of soft tissues. Excessive use of antimicrobials is similar to the results of previous studies from other developing countries^{13, 14, 15} which suggests that antimicrobials agents are commonly used drugs in clinical practice.

The prescriptions were better in respect to the duration of therapy, and dosage, which is consistent with the previous study.¹⁶ As far as irrational FDCs are concerned, out of total 43 antimicrobial FDCs, 27 prescriptions contained irrational FDCs. The irrational encounters of the present study were found to be similar to those observed in the previous studies.^{13, 17}

Irrationality of the use of antimicrobial FDCs could be due to trend of using more than one antimicrobial agent for common infections, non-use of first choice antimicrobials according to provisional diagnosis. The polypharmacy of antimicrobials seen in the prescriptions may be due to empirical use of antimicrobials without waiting for culture and sensitivity test for confirmatory diagnosis.⁷ Moreover, according to the previous studies, it has been observed that many reasons for antimicrobial overuse or misuse could be defensive prescribing, pressure from patients and relatives, inadequate knowledge of the proper indications.^{18, 19, 20}

Consistent with earlier reports there is a scope to improve rational and appropriate use of antimicrobials. A utilization review programme is an effective way of determining rationality of antibiotic usage. It is the need of time doctors should be made aware of the demerits of irrational prescribing and they should refrain from prescribing irrational FDCs. Many studies have shown that education at an individual or small group level and peer education are effective strategies to change doctors' antibiotic prescribing behavior.^{21, 22, 23} To improve the overall drug use, especially in developing countries, international agencies like WHO and International Network for Rational Use of Drugs (INRUD) have applied themselves to evolve standard drug use indicators.^{24, 25}

CONCLUSION

The present study reveals that the pattern of prescriptions in terms of rationality of antimicrobial FDCs remains poor. There is an urgent need to develop standards of antimicrobial drug prescriptions to avoid drug resistance. Educational interventions to promote

rational use of antimicrobial agents and awareness of deleterious impact of irrational prescribing habit on the community and all members of the health care system are needed.

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