Section

I

General

1. Rational Prescribing
2. Basic Pharmacokinetics

Chapter
1

Rational Prescribing

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Prescribing suitable drugs for the patient is the main role of a physician in clinical practice. Rational prescribing is described in simple terms as the five rights—right drug, right dose, right route, at the right time, and to the right patient. Selection of appropriate drug requires knowledge about clinical and therapeutic aspects. Safety, efficacy and cost, are other factors which need consideration. The practising physician is confronted by a large number of formulations, multi-drug combinations, as well as pressures at the workplace; pressures such as limited consultation time, incomplete records of past treatments from previous doctors, and patient non-compliance, are some barriers to safe prescribing.

FACTORS CONTRIBUTING TO IRRATIONAL PRESCRIPTIONS

- Demand from patient and/or family for immediate cure or quick relief. This leads to multiple prescriptions for many conditions (polypharmacy) which may not be relevant. The use of steroids is a case in point, where, symptomatic improvement in pain and fever, is brought about at the cost of serious side-effects.
- Inappropriate response to the drug because the patient does not follow instructions regarding the dose or duration.
- Lack of diagnostic facilities, atypical presentations of diseases.
- Information from industry which may not be validated by evidence-based medical data.
- Lack of suitable training and lack of guidance from experienced role models.

What can be done?

The impacts of irrational prescribing of drugs are, increased cost to the patient, wastage of resources, and emergence of unwanted effects like drug resistance, and adverse reactions.

The following actions will help to reduce irrational prescribing patterns:

- Providing information to physicians about standard guidelines for treatment (STG) from WHO websites and ICMR guidelines.

- Establishing prescribing pattern based on sound clinical and pharmacological principles.
- Updating information periodically based on evidence-based medicine principles.

PRINCIPLES OF RATIONAL PRESCRIBING

Prescribing pattern needs to be evidence-based considering clinical and pharmacological principles. The following general guidelines need to be adhered to:

- Keep treatment simple and inexpensive
- Select initial dose and later decide on maintenance dose as needed
- Add, or change one drug, only, at a time
- Educate the patient about the nature of illness and proposed treatment
- Anticipate side effects and give relevant information to the patient
- Avoid unnecessary medications
- Educate the patient about monitoring drug intake and observing the outcome
- Fix dates for follow-up after each visit.

STEPS INVOLVED IN RATIONAL PRESCRIBING

Initial step in the management of a patient is to confirm the diagnosis, which can be a provisional one based on history and physical examination, while awaiting laboratory tests. After a firm diagnosis is established, then appropriate changes can be made.

- ***Define specific therapeutic objective,*** e.g. cure, symptom control, prevention, quality of life. When therapy for chronic diseases are prescribed, with the objective of preventing long-term complications, clear explanation needs to be given about continuing the drugs life-long, even after the current stocks of medicines are over. This is a difficult concept for patients to understand. This accounts for considerable defaulting on drugs for hyperlipidemia, diabetes and hypertension, to name a few.
- ***Efficacy:*** Beneficial effects related to outcome should be more than the risk of producing side effects.
- ***Safety***: The frequency and seriousness of adverse effects should be known, and the drugs be avoided if the associated morbidity is considerable. For example, postural hypotension with some anti-hypertensives, or the possibility of renal damage in the elderly with NSAIDs, and diuretic combinations.
- ***Suitability***: The drug should be one which has not previously given idiosyncratic side-effects or allergies to the individual patient, based on the experience of past medications, e.g. headaches with nitrates, vomiting with oral contraceptive pills, amoxicillin-induced diarrhoea, etc.
- ***Affordability***: Cheaper alternatives should always be tried, and costs of medications should be discussed with the patient. Non-compliance with medications is often related to high costs.
- ***Drug dosage***: The dosage should be tailored to the level of the disease process, such as severity of diabetes or hypertension. Age, hepatic and renal function, and other comorbidities should be factored in.
- ***Frequency and time of administration of drug use***: The lifestyle of the patient should be factored in. For example, a patient on a fast for religious or other reasons needs adjustment of oral hypoglycemic drugs timings to timing of food intake; or a patient with nocturia would need diuretics to be taken in the morning hours.

PATIENT EDUCATION AND COUNSELLING

No consultation is complete without addressing the following points.

- Discuss what benefits may be expected and how soon
- Provide relevant information about likely adverse effects
- Discuss what is to be done if adverse effects occur, always providing a safety net.
- Fix a date for the next visit to review outcome and further counsel the patient.

ADDITIONAL CONSIDERATION

- ***Use of brand names***: It is desirable to prescribe drugs using their generic names. However, many patients and physicians prefer brand names, with which most pharmacies are familiar with. Since there are innumerable brand names for generic formulations, a frequent problem of duplication of the drug occurs when a patient visits a new doctor who is not familiar with the brand name which the patient is taking. The best solution appears to be to mention the generic name in brackets, alongside the brand name, or vice versa, to avoid confusion.
- ***Alcohol intake***: Some drugs such as metronidazole, and sedatives should not be taken concurrently with alcohol, and this warning should be given.
- Meal timings and drug intake is important in some instances (*see* Section 1, Chapter 2).
- ***Use of fixed drug combinations (FDC)***: In general FDCs are not advisable, (Box 1.1), but there are some exceptions when they may in fact be useful as given in Table 1.1.

Box 1.1: Limitations of fixed drug combinations

- Difficult to identify which drug is causing the adverse effects, if it is reported
- Difficult to change the dose of one drug in the combination without changing the other
- Combinations may have sub-therapeutic doses of individual drugs
- Addition of non-essential agents like vitamins which increase the cost of drugs

Table 1.1: Some useful fixed drug combinations

Drug 1 + 2	*Combination drug*	*Reason for benefit*
Trimethoprim+ Sulfamethoxazole	Cotrimoxazole	Synergistic action giving a better therapeutic effect
Artenusate + Halofantrine	Artenusate combination therapy (ACT)	Prevents resistance to artesunate in falciparum malaria
Frusemide + Spironolactone	Lasilactone	Prevents diuretic-induced hypokalemia

RATIONAL USE OF ANTIBIOTICS

Though antibiotics are life-saving, their widespread and indiscriminate use has led to anti-microbial resistance, making individual antibiotics in-effective in many cases. Keeping this in mind, physicians must consider themselves as "antibiotic stewards", self-regulating their usage in the most rational manner according to the principles below:

- Selection of the drug should be the most specific, most effective and economical in the clinical case.
- Avoid use for minor illnesses, which do not appear to be bacterial in origin. Do not be swayed by patients' demands for a quick recovery.

- Start with empirical therapy, but consider culture and sensitivity whenever possible.
- Gather information about sensitivity pattern of antibiotics from (local) information data bases wherever possible.
- Consider single drugs for the shortest duration possible.
- Attention to age-related factors, pregnancy, hepatic and kidney functions.
- Special caution about history of allergy before writing prescriptions.
- Be aware of resistance to antibiotics and diarrhoea related to their use.