Rational Drug Use (RDU)

Introduction to Rational Drug Use (RDU)

Overview / Introduction

- Rational Drug Use (RDU), also known as Rational Use of Medicines (RUM), is a core principle of clinical pharmacotherapeutics.
- It ensures that medications are prescribed, dispensed, and used in a manner that maximizes therapeutic benefit, minimizes risk of harm, and promotes cost-effectiveness.
- This approach is fundamental in optimizing patient outcomes while preventing irrational practices, such as overprescription, misuse, polypharmacy, or use of unnecessary expensive drugs.
- The World Health Organization (WHO) first articulated the concept of Rational Drug Use in the 1985 Nairobi Conference, laying the foundation for national drug policies worldwide.

Definition (According to WHO)

- "Rational use of medicines requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community."
- Thus, RDU emphasizes four key components:
    - Right **drug**
    - Right **dose**
    - Right **duration**
    - Right **cost**

Scope and Importance in Pharmacotherapeutics

- In **pharmacotherapeutics**, RDU underpins:
    - Evidence-based drug selection.
    - Personalized therapy considering comorbidities and pharmacokinetics.
    - Avoidance of adverse drug reactions and drug interactions.
    - Cost-containment and reduction in healthcare burden.
    - Better compliance and patient satisfaction.
    - Prevention of **antimicrobial resistance (AMR)** and **iatrogenic illnesses**.

Factors Influencing Rational Drug Use

- Several factors affect rational prescribing and use:
    - **Prescriber factors**: Lack of training, outdated knowledge, influence of pharma promotions.

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- **Patient factors**: Beliefs, compliance issues, self-medication.
- **Health system factors**: Poor drug availability, inadequate supervision, irrational formularies.
- **Economic and cultural factors**: Pressure to prescribe brand names or injections.

Consequences of Irrational Drug Use

- Increased **morbidity and mortality**.
- Development of **drug resistance** (e.g., antibiotics, antimalarials).
- Increased **adverse drug reactions (ADRs)**.
- Wastage of resources and increased cost of care.
- Legal and ethical consequences for healthcare professionals.

WHO Indicators for Assessing RDU

The WHO has outlined **core indicators** to monitor rational use in practice:

1. **Prescribing indicators:**
   - Average number of drugs per encounter
   - % of drugs prescribed by generic name
   - % of encounters with antibiotics
   - % with injections
2. **Patient-care indicators:**
   - Average consultation and dispensing time
   - % of drugs actually dispensed
3. **Facility indicators:**
   - Availability of Essential Drugs List (EDL)
   - Availability of key drugs

Definition of Rational Drug Use (RDU)

Formal Definition (WHO)

- As per the World Health Organization (1985):
  - "Rational drug use means that patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements, for an adequate period of time, and at the lowest cost to them and their community."
- This definition serves as the global benchmark for medical practitioners, pharmacists, and public health policymakers.

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Breakdown of the Definition

Appropriate to Clinical Needs

- The drug chosen should match the diagnosis.
- It must have scientific evidence of efficacy for the specific indication.
- It should be suitable for the patient's age, sex, comorbidities, and organ functions (renal, hepatic, etc.).
- Example: Using ACE inhibitors in hypertension but avoiding them in pregnancy or bilateral renal artery stenosis.

Doses that Meet Individual Requirements

- Dosage should be based on:
  - Body weight / Body surface area (BSA)
  - Renal or hepatic function
  - Pharmacokinetic profile of the drug
- Adjustments needed for:
  - Elderly and pediatric patients
  - Pregnancy
  - Drug interactions
- Example: Aminoglycosides require dose adjustment in patients with renal impairment.

Adequate Duration of Treatment

- Duration must be long enough to achieve full therapeutic effect.
- Must avoid:
  - Premature discontinuation (can cause treatment failure or resistance)
  - Unnecessarily long treatment (may increase adverse effects)
- Example: Completing full antibiotic course in bacterial infections to prevent resistance.

Lowest Cost to Patient and Community

- Consider both direct costs (drug price) and indirect costs (hospital visits, lab tests).
- Prefer:
  - Generic drugs over branded
  - Oral therapy over injectable (when equally effective)
  - Drugs from Essential Medicines List (EML)
- Example: Using metformin for type 2 diabetes before initiating expensive newer agents.

Expanded Definitions in Modern Context

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- With advancements in medicine, the concept has evolved to include:
  - **Patient-centered care**: taking into account preferences, values, and beliefs.
  - **Evidence-based practice**: using clinical guidelines and systematic reviews.
  - **Pharmacoeconomics**: cost-effectiveness and budget impact assessments.
  - **Social and public health responsibility**: minimizing misuse and overuse (e.g., antibiotics).

Application in Pharmacotherapeutics

- A rational approach in pharmacotherapeutics involves:
  - Stepwise assessment of symptoms, diagnosis, drug selection, monitoring, and patient feedback.
  - Avoiding:
    - Polypharmacy
    - Empirical prescribing without diagnosis
    - Therapeutic duplication
    - Drug interactions or contraindications

Contrasting with Irrational Drug Use

Rational Use	Irrational Use
Based on evidence	Based on assumption or commercial promotion
Personalized dosing	Standard dose to all
Complete treatment course	Arbitrary stoppage
Generic/Essential drugs	Unnecessary expensive brands
Follow-up and monitoring	No monitoring of response or toxicity

Examples of Rational vs Irrational Use

Situation	Rational Practice	Irrational Practice
Fever in children	Use paracetamol in correct dose	Use antibiotic without indication
Mild pain	Use oral NSAID if no contraindications	Prescribe IV injection unnecessarily
Hypertension	Start with thiazide diuretic or ACE inhibitor	Combine 3 antihypertensives at once
Cough & cold	Use supportive treatment	Give antibiotics for viral infection

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Role of Pharmacist in Rational Drug Use

Overview

- Pharmacists are central figures in promoting Rational Drug Use (RDU). Their role extends far beyond dispensing—encompassing drug selection, dosage individualization, patient education, monitoring therapy, and collaboration with prescribers.
- In clinical pharmacotherapeutics, pharmacists bridge the gap between drug knowledge and patient care, ensuring that medications are used safely, effectively, and economically.

Core Responsibilities of a Pharmacist in RDU

Drug Information Provider

- Provide accurate, unbiased, and up-to-date information to:
  - Physicians (on dosing, drug interactions, therapeutic alternatives)
  - Nurses (on administration, preparation, infusion compatibility)
  - Patients (on how to take drugs, possible side effects, storage)
- Example: Advising a doctor to avoid combining **warfarin with NSAIDs** due to increased bleeding risk.

Participation in Therapeutic Decision-Making

- Clinical pharmacists are increasingly part of multidisciplinary healthcare teams.
- They assist in:
  - **Selection of first-line drugs**
  - **Individualization of therapy** (based on renal/hepatic function, age)
  - **Therapeutic Drug Monitoring (TDM)** for narrow therapeutic index drugs (e.g., digoxin, aminoglycosides)
- Example: Adjusting **gentamicin** dose based on creatinine clearance.

Promotion and Use of Essential Medicines

- Educate prescribers about the **Essential Medicines List (EML)** and ensure its use in prescribing and hospital formularies.
- Encourage cost-effective choices without compromising efficacy.
- Example: Suggesting **losartan** (essential drug) instead of an expensive ARB like **azilsartan**.

Detection and Prevention of Drug Interactions and ADRs

- Monitor patient profiles and medication charts for:
  - **Drug-drug interactions**
  - **Drug-food interactions**
  - **Potential adverse drug reactions**

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