Unit-2
Pharmacy Practice

B.Pharma 7 Sem Notes

1. Drug distribution system in a hospital

- Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

2. Hospital formulary

- Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary

3. Therapeutic drug monitoring

- Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

4. Medication adherence

- Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

5. Patient medication history interview

- Need for the patient medication history interview, medication interview forms.

6. Community pharmacy management

- Financial, materials, staff, and infrastructure requirements.

Drug Distribution System in a Hospital

Introduction

DEFINITION

Drug distribution system is the method by which medicines are supplied from the hospital pharmacy to the patients (inpatients and outpatients) in a safe, accurate, and economical way. A good drug distribution system ensures that the right drug reaches the right patient, at the right time, in the right dose, and through the right route.

Dispensing of Drugs to Inpatients

Inpatients are the patients who are admitted to the hospital and stay in wards. Medicines are supplied to them directly from the hospital pharmacy through the nursing staff. The drugs are given according to the doctor's order sheet.

The main objectives of inpatient dispensing are:

- To supply the right drug to the right patient at the right time.
- To reduce medication errors and drug wastage.
- To maintain proper record of drug usage.
- To ensure economical and rational drug use.

Types of Drug Distribution Systems

There are mainly four types of drug distribution systems used in hospitals:

A) Individual Prescription Order System

In this system, the prescription is written by the doctor for an individual patient and sent to the pharmacy. The pharmacist dispenses the medicine for that specific patient only. It is commonly used in small hospitals.

- **Advantages:** Direct review of prescription by pharmacist.
- Close patient–pharmacist–doctor interaction, less drug wastage, better control on drugs.
- **Disadvantages:** Time consuming and delays in emergency cases.

B) Floor Stock System

In this system, commonly used drugs are kept in the wards as ward stock. Nurses take the required drugs from the stock and give them to patients as per doctor's order. It is of two types — Complete floor stock (all drugs) and Partial floor stock (only common drugs).

- **Advantages:** Ready availability, useful in emergency, less paperwork.

- **Disadvantages:** Higher risk of medication errors, drug loss, and no pharmacist review.

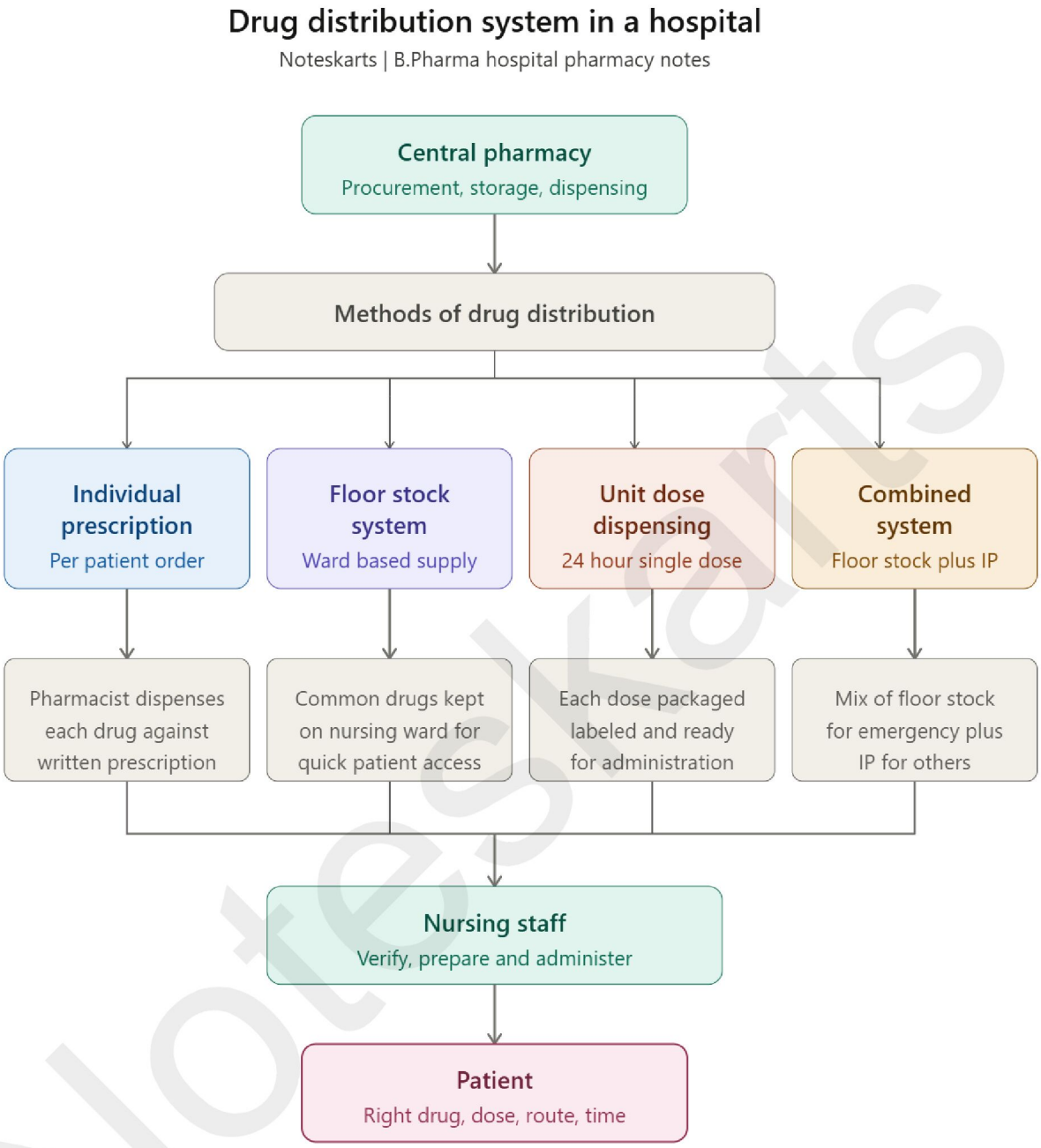
C) Combination of Individual and Floor Stock System

Most hospitals use a mixture of both systems. Emergency and commonly used drugs are kept as floor stock, while costly, rarely used, or specific drugs are dispensed individually from the pharmacy. This gives the benefits of both systems.

D) Unit Dose Dispensing System (UDDS)

This is the most modern and safest system. Each dose of medicine is packed, labelled, and supplied separately for a single administration time (for example, a 24-hour supply packed in individual units).

- **Advantages:** Minimum medication errors, less drug wastage, pharmacist checks every dose, better inventory control.
- **Disadvantages:** Requires trained staff, special equipment, and higher initial cost.



Five rights of drug administration

Right patient · Right drug · Right dose · Right route · Right time
Goal: safe, accurate and timely medication delivery to every patient

Charging Policy and Labelling

Charging Policy

The charging policy decides how the cost of medicines is recovered from the patient. The main systems are:

- **Direct Charge:** Each drug is charged as and when it is given to the patient.
- **Indirect Charge:** Drug cost is included in the total bed charge.
- **Free Supply:** For government/charitable hospitals, medicines are given free.

Labelling

Every medicine dispensed to a patient must carry a proper label. A good label should contain:

- Name of the hospital / pharmacy.
- Patient's name, age, and bed / OPD number.
- Name and strength of the drug.
- Dose, route, and frequency of administration.
- Date of dispensing and expiry date.
- Special instructions (e.g., "shake well", "before food").
- Name and signature of the dispensing pharmacist.

Dispensing of Drugs to Ambulatory Patients

Ambulatory (outpatient or OPD) patients are those who come to the hospital for consultation and go back home. They get their medicines from the outpatient pharmacy based on a prescription.

Steps in dispensing to OPD patients:

- Receiving and reading the prescription carefully.
- Checking the prescription for completeness and legality.
- Interpreting the drug name, dose, frequency, and duration.
- Selecting the correct medicine from the rack.
- Counting, packing, and labelling the medicine.
- Counselling the patient about usage, timing, and side effects.
- Collecting payment and issuing a cash memo.
- Recording the sale in the register.

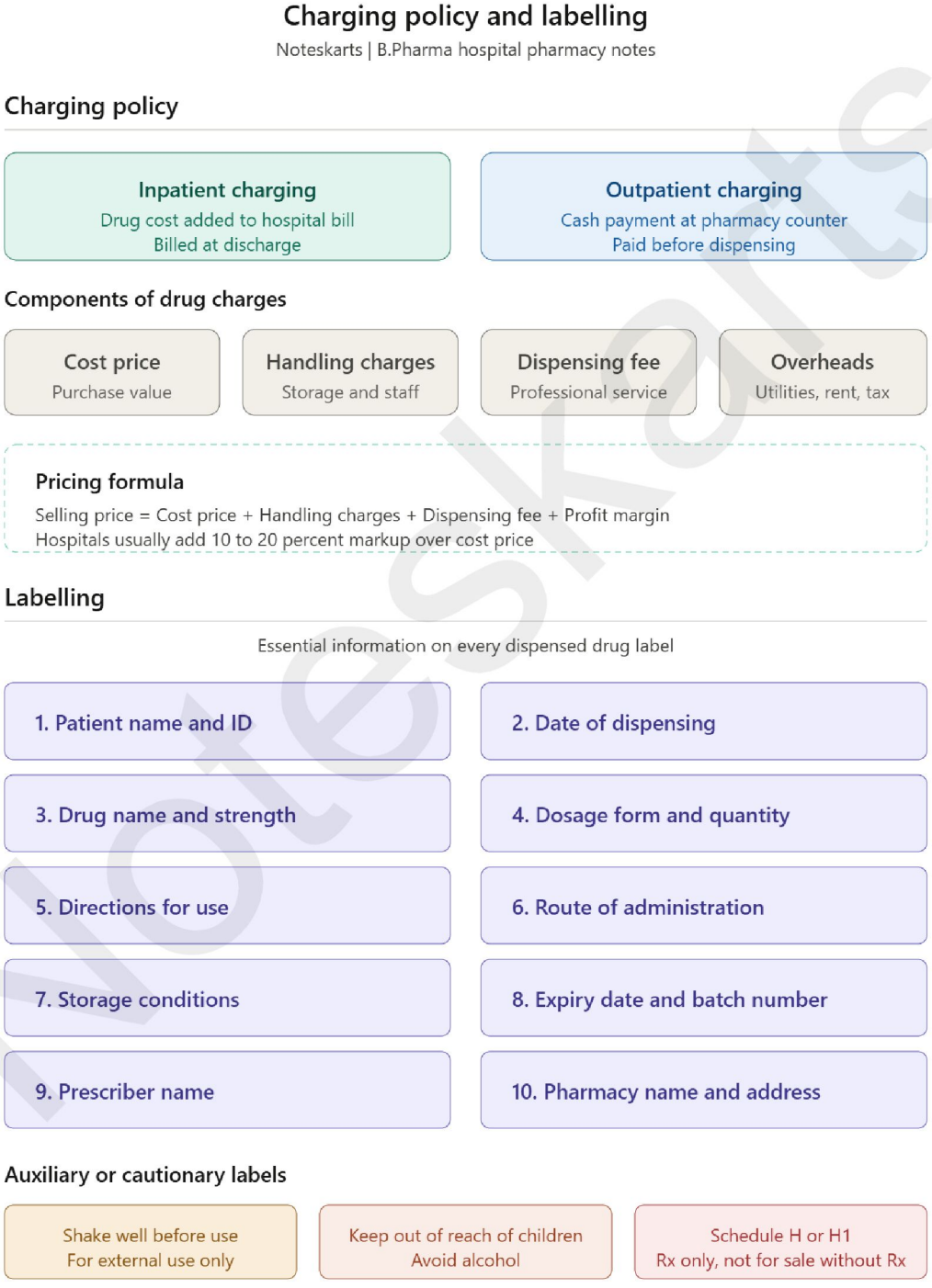
Dispensing of Controlled Drugs

Controlled drugs are those drugs which can be misused or are habit-forming, such as narcotics, psychotropic drugs, and Schedule X drugs. Their dispensing is strictly regulated by the NDPS Act 1985 and Drugs & Cosmetics Rules.

Important rules for dispensing controlled drugs:

- Dispensed only on a valid prescription from a registered medical practitioner.
- Prescription must be in duplicate and signed by the doctor with registration number.

- Must be stored in a separate locked cupboard with double lock (narcotic cupboard).
- A special Narcotic Register must be maintained showing receipt, issue, and balance.
- Records must be preserved for at least 2 years.
- Only a qualified pharmacist is allowed to dispense these drugs.
- Any discrepancy, theft, or loss must be reported to authorities immediately.



Hospital Formulary

Definition

> **DEFINITION**
> *A hospital formulary is a continuously updated list of medicines and important information about them, which represents the clinical judgement of the medical staff of the hospital. It is prepared by the Pharmacy and Therapeutics Committee (PTC) and used by doctors, pharmacists, and nurses to promote rational and economical drug use within the hospital.*

Contents of Hospital Formulary

A hospital formulary is generally divided into three main parts:

Part I — General Information

- Name of the hospital and formulary committee members.
- Purpose, scope, and use of the formulary.
- Hospital pharmacy policies and procedures.
- Rules for prescription writing and drug use.
- Information about Pharmacy and Therapeutics Committee.

Part II — Drug Products

- List of drugs accepted for use in the hospital.
- Generic name, brand name, strength, and dosage forms.
- Therapeutic classification of drugs.
- Dose, route, indications, contraindications, side effects.
- Drug interactions and precautions.
- Cost / price information.

Part III — Special Information / Appendix

- List of poisons and their antidotes.
- Tables of normal lab values.
- Metric system and dose calculations.
- Nutritional products, IV fluids, and emergency drugs.
- Abbreviations used in prescription writing.

Hospital Formulary vs Drug List

Hospital Formulary	Drug List
Detailed document with full drug information	Simple list of drug names only
Contains dose, indications, side effects, interactions	Contains only names and strengths
Prepared and revised by PTC	Prepared by the pharmacy or purchase department
Used as a clinical reference guide	Used mainly for purchase and inventory
Updated periodically (usually every 1–2 years)	Updated frequently as per stock
Helps in rational drug use	Helps in stock management

Preparation and Revision of Hospital Formulary

The Pharmacy and Therapeutics Committee (PTC) is responsible for preparing and revising the formulary. The usual steps are:

- Formation of the PTC with doctors, pharmacists, nurses, and administrators.
- Collecting information about commonly used and essential drugs.
- Reviewing evidence of safety, efficacy, and cost-effectiveness of drugs.
- Classifying drugs by therapeutic category.
- Writing monographs for each drug with full details.
- Printing, distributing, and training staff on its use.
- Revising the formulary every 1–2 years to add new drugs and remove old ones.

Addition and Deletion of Drugs

Addition of a Drug

A new drug can be added to the formulary on request of a doctor or department. The procedure is:

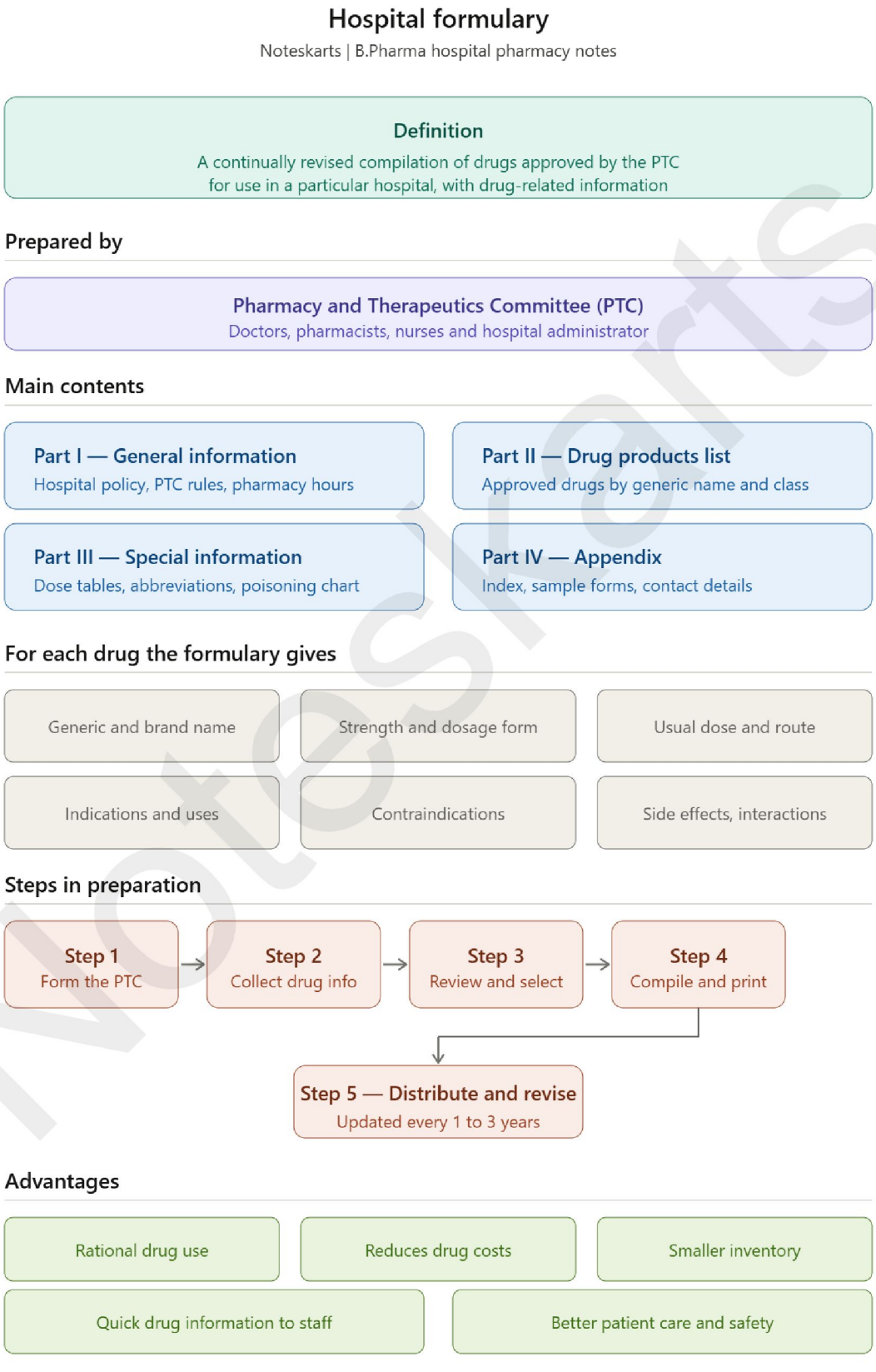
- Written request giving the name of the drug and reason for inclusion.
- PTC reviews the drug's safety, efficacy, cost, and need.
- Comparison with existing formulary drugs.
- Approval and addition if the drug shows clear advantage.

Deletion of a Drug

A drug is removed from the formulary if:

- It is no longer used or has been replaced by a better drug.
- It has been banned or withdrawn from the market.

- It shows serious adverse effects or high toxicity.
- A cheaper and equally effective alternative is available.



Therapeutic Drug Monitoring (TDM)

Definition

> **DEFINITION**
> *Therapeutic Drug Monitoring (TDM) is the measurement of drug concentration in the blood (plasma or serum) of a patient at specific time intervals, to ensure that the drug level stays within the therapeutic range — high enough to be effective but not so high that it becomes toxic. TDM is used mainly for drugs with a narrow therapeutic index.*

Need for Therapeutic Drug Monitoring

TDM is especially needed in the following situations:

- For drugs with a narrow therapeutic window (e.g., digoxin, phenytoin, lithium, theophylline, gentamicin).
- When there is no clear clinical sign to judge drug effect.
- To avoid drug toxicity and adverse effects.
- To check patient compliance with therapy.
- In patients with liver or kidney disease where drug metabolism is altered.
- In children, pregnant women, and elderly patients where dose adjustment is difficult.
- When drug interactions may affect drug levels.
- To find the correct individualized dose for a patient.

Drugs Commonly Monitored by TDM

Category	Example Drugs
Antiepileptics	Phenytoin, Carbamazepine, Valproate
Cardiac drugs	Digoxin, Procainamide, Lidocaine
Antibiotics	Gentamicin, Amikacin, Vancomycin
Bronchodilators	Theophylline
Immunosuppressants	Cyclosporine, Tacrolimus
Psychiatric drugs	Lithium, Tricyclic antidepressants

Factors to Be Considered During TDM

While doing TDM the following factors should be kept in mind:

- **Time of sampling:** Blood samples should be taken at the right time (peak, trough, or steady state).
- **Steady state:** Drug concentration should be measured at steady state (usually after 4–5 half-lives).
- **Route of administration:** Oral, IV, or IM — affects absorption and timing of samples.
- **Patient factors:** Age, weight, genetics, liver and kidney function.
- **Plasma protein binding:** Affects protein binding and total drug level.
- **Drug interactions:** Other drugs may increase or decrease plasma concentration.
- **Analytical method:** HPLC, immunoassays, and spectrophotometry should be accurate and reliable.
- **Clinical correlation:** The measured level should always be linked with patient's clinical response.

Indian Scenario for TDM

TDM in India is still developing and is mostly available in large tertiary hospitals and medical college hospitals. Important points are:

- Major centres like AIIMS, PGI Chandigarh, CMC Vellore, and NIMHANS have active TDM services.
- Commonly monitored drugs include antiepileptics, immunosuppressants, and antibiotics.
- Lack of awareness, high cost of equipment, and limited trained staff restrict wider use.
- Clinical pharmacists play an important role in TDM services in India.
- With the growth of clinical pharmacy practice and Pharm D courses, TDM is gradually expanding.

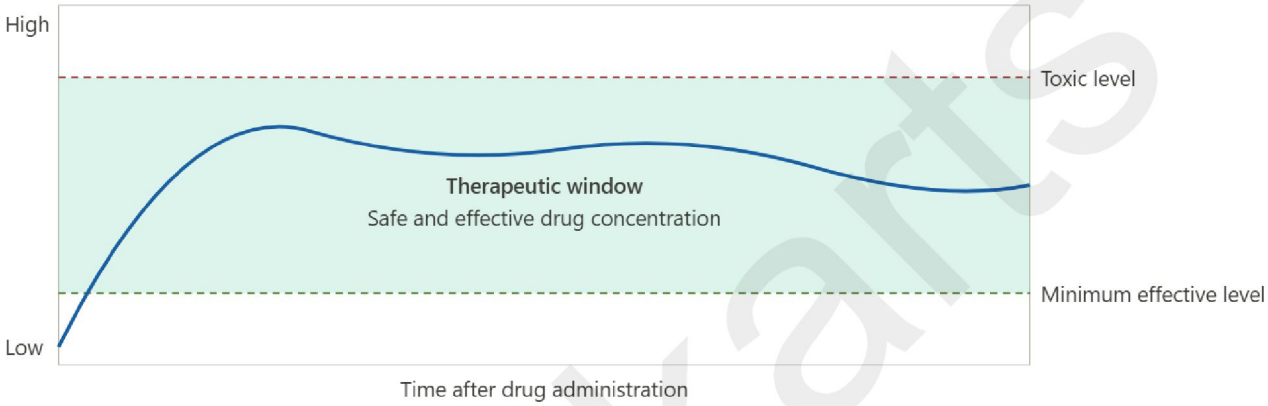
Therapeutic drug monitoring (TDM)

Noteskarts | B.Pharma hospital pharmacy notes

Definition

Measurement of drug concentration in body fluids (plasma or serum) to individualise dosage for maximum benefit and minimum toxicity

The therapeutic window



Above window → toxicity
Adverse drug reactions and side effects

Below window → no effect
Treatment failure or resistance

Drugs that need TDM

Drugs with narrow therapeutic index and high toxicity risk

Digoxin Cardiac glycoside	**Phenytoin** Antiepileptic	**Lithium** Antimanic	**Aminoglycosides** Antibiotics
Warfarin Anticoagulant	**Theophylline** Bronchodilator	**Cyclosporine** Immunosuppressant	**Methotrexate** Anticancer

TDM process

1. **Prescribe** — Start drug therapy
2. **Sample** — Collect blood
3. **Analyse** — Measure level
4. **Interpret** — Compare with window
5. **Adjust dose** — Individualised therapy

Goal: right drug, right dose, right patient — safe and effective therapy

Medication Adherence

Definition

> **DEFINITION**
> *Medication adherence (or compliance) means the extent to which a patient takes medications as prescribed by the doctor — correct drug, correct dose, correct time, and for the correct duration. Non-adherence means not following the prescribed medicine schedule, which leads to treatment failure, disease progression, and increased healthcare cost.*

Causes of Medication Non-Adherence

Non-adherence can happen due to many reasons, which are grouped as follows:

A) Patient-Related Factors

- Forgetfulness, especially in elderly patients.
- Lack of knowledge about the disease or drug.
- Fear of side effects.
- Feeling better and stopping medicine early.
- Negative beliefs, cultural or religious factors.

B) Drug-Related Factors

- Complex dosing schedules (many drugs at different times).
- Unpleasant taste, smell, or large tablet size.
- Side effects like nausea, drowsiness, dizziness.
- Long duration of therapy (e.g., TB, hypertension, diabetes).

C) Disease-Related Factors

- Chronic and symptomless conditions (hypertension, diabetes).
- Mental illness or dementia.

D) Socioeconomic & Healthcare System Factors

- High cost of medicines.
- Lack of access to pharmacy or hospital.
- Poor doctor-patient communication.
- Language barriers and illiteracy.
- Lack of family or social support.

Role of Pharmacist in Medication Adherence

The pharmacist plays a very important role in improving medication adherence by being the most accessible healthcare professional. Key roles include:

- Educating the patient about the disease and the importance of medicines.
- Explaining dose, timing, route, and duration in simple language.
- Giving a written or pictorial medication chart.
- Warning about side effects and how to manage them.
- Simplifying the dosing schedule (e.g., once-daily instead of thrice-daily).
- Providing pill boxes or dose reminders for chronic patients.
- Telling patients not to stop medicine suddenly without doctor's advice.
- Counselling about diet, lifestyle, and follow-up.
- Involving family members in care, especially for elderly patients.
- Monitoring therapy and reporting to the doctor when needed.

Monitoring of Patient Medication Adherence

Adherence can be checked by both direct and indirect methods.

A) Direct Methods

- Measuring the drug or its metabolite in blood or urine.
- Directly observing the patient taking medicine (e.g., DOTS in TB).
- Accurate but costly and not always practical.

B) Indirect Methods

- Asking the patient (self-reporting).
- Pill count — counting remaining tablets at follow-up.
- Checking pharmacy refill records.
- Clinical response of the patient.
- Using adherence scales like Morisky Medication Adherence Scale (MMAS).
- Electronic monitoring devices (smart pill bottles, MEMS caps).

Medication adherence

Noteskarts | B.Pharma hospital pharmacy notes

Definition (WHO)
The extent to which a patient takes medication as prescribed in dose, timing, frequency and duration agreed with the prescriber

Adherence	Compliance
Patient agrees and follows plan	Patient passively follows orders

Factors affecting adherence (5 WHO dimensions)

Patient factors	Therapy factors	Condition factors
Forgetfulness, beliefs motivation, literacy	Complex regimen side effects, duration	Severity, symptoms mental illness

Socio-economic	Healthcare system
Cost of medication family support, culture	Access, cost, doctor patient relationship

Types of non-adherence

Intentional	Unintentional	Primary
Patient decides to skip	Forgets or misunderstands	Rx never filled

Consequences of non-adherence

Treatment failure	Drug resistance	Hospital readmission
Disease progression	In TB, HIV, antibiotics	Higher morbidity

Increased healthcare cost	Increased mortality
Extra tests and drugs	Avoidable deaths

Strategies to improve adherence

Patient counselling	Simplify regimen	Pill organisers
Educate about disease, drug	Once-daily, FDC tablets	Weekly pill box, charts

Reminder systems	Family support	Follow up visits
Alarms, SMS, apps	Caregiver involvement	Regular monitoring

Minimise side effects	Affordable medication
Adjust dose or change drug	Generic drugs, Jan Aushadhi

Patient Medication History Interview

Definition

DEFINITION

A patient medication history interview is an organized discussion between a pharmacist (or other healthcare professional) and a patient to collect complete information about all the medicines the patient has used or is currently using. It includes prescription drugs, OTC products, herbal medicines, dietary supplements, and any history of drug allergy or adverse reactions.

Need for Patient Medication History Interview

This interview is an important part of clinical pharmacy practice and has the following uses:

- To get a complete picture of the patient's past and current medicines.
- To identify drug allergies and previous adverse drug reactions.
- To detect duplication of therapy or drug interactions.
- To check patient compliance with previous treatment.
- To avoid medication errors during hospital admission.
- To find out the use of self-medication, OTC, and herbal drugs.
- To help the doctor plan safe and effective therapy.
- To build a good pharmacist–patient relationship.
- To serve as a legal document in patient's case file.

Steps of Taking a Medication History

- Introduce yourself and explain the purpose of the interview.
- Ensure privacy and comfortable environment.
- Ask open-ended questions in simple language.
- Record drug name, dose, frequency, and duration for each medicine.
- Ask about allergies, side effects, and compliance.
- Ask about OTC, herbal, and traditional medicines.
- Ask about alcohol, tobacco, and recreational drug use if relevant.
- Verify the information with prescriptions or old records.
- Summarize and document the history properly.

Medication Interview Forms

A medication interview form is a structured sheet used to record the patient's medication history. It makes the process standardized and complete. A typical form contains:

- Patient's name, age, sex, weight, OPD/IP number.
- Chief complaints and present illness.
- Past medical history and surgical history.
- Family history and social history.
- List of current medications with dose, frequency, and duration.
- List of past medications used for the same or other conditions.
- Known drug allergies and adverse reactions.
- Use of OTC drugs, herbal products, and supplements.
- Habits — smoking, alcohol, caffeine, etc.
- Compliance status and reasons for non-adherence.
- Signature of the pharmacist and date of the interview.

Patient medication history interview

Noteskarts | B.Pharma hospital pharmacy notes

Definition

A structured interview by the pharmacist to collect complete, accurate information about a patient's past and current medication use

Objectives

- **Accurate history** — Complete drug record
- **Detect DRPs** — Problems and ADRs
- **Avoid duplication** — Prevent interactions
- **Assess adherence** — Check if doses are taken correctly
- **Plan rational therapy** — Guide safe prescribing

Steps of the interview

1. **Preparation** — Review case sheet
2. **Introduction** — Greet, build rapport
3. **Explain** — Purpose and privacy
4. **Question** — Open, then specific
5. **Listen** — Observe patient
6. **Verify** — Cross-check sources
7. **Document** — Record in file
8. **Close** — Thank the patient

Information to be collected

- **Demographics** — Name, age, weight, sex
- **Current medicines** — Name, dose, frequency
- **Past medication** — Recently stopped drugs
- **OTC and herbal** — Self-medication use
- **Allergies and ADRs** — Drug, food reactions
- **Vaccination record** — Immunisation history
- **Social history** — Smoking, alcohol, diet
- **Pregnancy, lactation** — For female patients
- **Adherence level** — Missed doses, reasons

Sources of information

- Patient
- Family, caregiver
- Old prescriptions
- Drug containers
- Medical records and case sheet
- Doctor, nurse, previous pharmacy

Outcome: accurate medication history → safer, individualised patient care

Community Pharmacy Management

Introduction

A community pharmacy (retail drug store) is a small business as well as a health service provider. Its success depends on proper management of finance, materials, staff, and infrastructure. Good management ensures profit, patient satisfaction, and legal compliance.

Financial Management

Financial management means planning, organizing, and controlling the money related activities of the pharmacy. It includes:

- **Capital Requirement:** Estimating the money required for land, shop, furniture, and initial stock.
- **Sources of Finance:** Own capital, bank loan, or partnership.
- **Expenditure:** Money spent on purchase of medicines, salaries, rent, electricity, taxes, and other expenses.
- **Income:** Revenue from sale of medicines and healthcare products.
- **Book Keeping:** Maintaining proper accounts — cash book, ledger, sales/purchase records, GST returns.
- **Pricing:** Based on MRP with proper margin on the purchase price.
- **Profit Calculation:** Total sales minus total expenditure.
- **Taxation:** Proper filing of GST and income tax returns.

Materials Management

Materials management deals with the purchase, storage, and distribution of medicines and other products. Its aim is to keep the right stock in the right quantity at the right time.

- Selection of reliable suppliers/wholesalers.
- Proper purchase procedure — quotation, comparison, purchase order.
- Stock management using ABC analysis, VED analysis, and FIFO (first in, first out).
- Maintaining minimum and maximum stock levels.
- Proper storage — temperature, humidity, light, and ventilation control.
- Refrigeration for vaccines, insulin, and other thermolabile drugs.
- Regular expiry checking and disposal of expired products.
- Maintaining purchase, sales, and stock registers.

Staff Management

Staff is the backbone of any community pharmacy. Good staff management ensures better customer service and smooth daily operations.

- **Mandatory Staff:** At least one registered pharmacist (mandatory under Drugs & Cosmetics Rules).
- **Supporting Staff:** Sales assistants, billing clerk, store keeper, and helper.
- **Recruitment:** Recruitment based on qualification, skill, and experience.
- **Training:** Regular training on new drugs, patient counselling, and software use.
- **Duty Allocation:** Fixing working hours, duty roster, and salary structure.
- **Discipline:** Good behaviour with customers, honesty, and hygiene.
- **Motivation:** Rewards and incentives for good performance.

Infrastructure Requirements

A community pharmacy should have proper infrastructure to provide quality service and satisfy legal requirements.

- **Area & Location:** Minimum 10 sq. m. for retail or wholesale, 15 sq. m. if both. Shop should be in a good location with easy customer access.
- **Building:** Proper ventilation, lighting, and pest-free environment.
- **Furniture:** Shelves, racks, cupboards, dispensing counter, and chairs.
- **Equipment:** Refrigerator, air conditioner, computer, billing machine, printer, weighing balance.
- **Safety:** Separate locked narcotic cupboard, poison cupboard, and fire safety equipment.
- **Software:** Pharmacy management software for stock, billing, and accounts.
- **Utilities:** Clean waiting area, drinking water, and washroom for staff.
- **Display:** Display of drug license, pharmacist's registration certificate, and price list.

Thank You for Reading!

We hope this book helped you in your studies.

If you want to access complete notes, PDFs, and study material for your course, scan the QR code below.

Scan & Download All Notes

What You'll Get:

- B.Pharm & D.Pharm Notes
- Exam-Oriented PDF Materials
- Regular Updates & New Content

Stay Connected for More Updates

Visit: https://noteskarts.com/

Contact: noteskartsconnect@gmail.com

One Scan = All Notes at Your Fingertips!