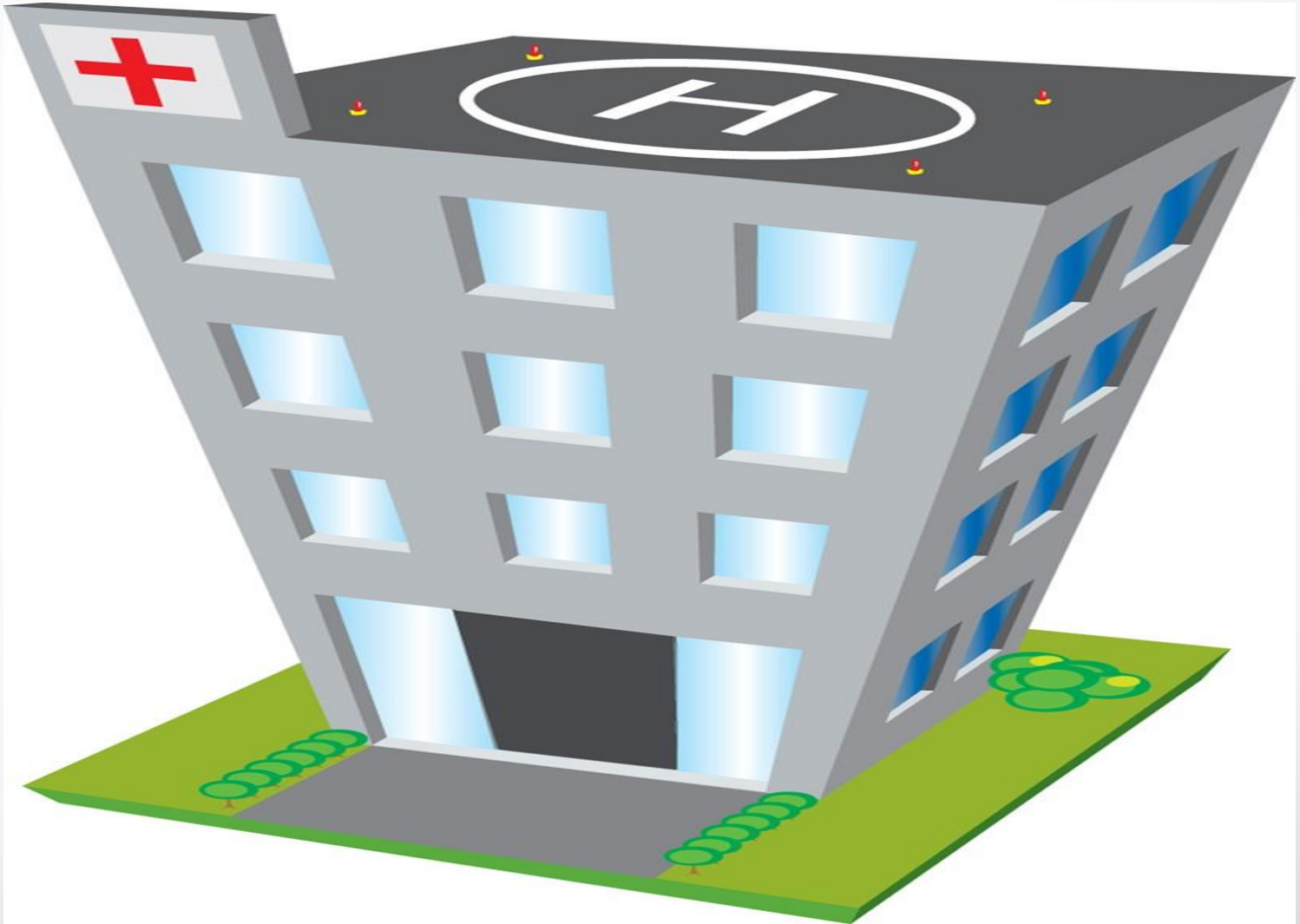
1.Institutional patient care

The hospital



Definitions

Hospital pharmacy : Branch of pharmaceutical sciences that deals with the pharmacy profession and the role of pharmacist inside the hospital

Pharmacy

It is the clinical health science that links medical science with chemistry and it includes the discovery, production, safe and effective use, and control of medications and drugs. The practice of pharmacy requires excellent knowledge of drugs, their mechanism of action, side effects, interactions, mobility and toxicity.

Pharmacist's patient care practice

Role of hospital pharmacist

1- Consultive role.

A hospital pharmacist is required to be a great source of advice for patients and work closely with medical and nursing staff on wards to ensure that the most appropriate treatment is being delivered. Hospital pharmacists can suggest whether tablet, injections, ointment or inhaler may be the best form of medication .

2. provision of drug information

Hospital pharmacists can offer information on potential side effects and check that medicines are compatible with existing medication.

3. Daily clinical rounds

They can inform patients on all aspects of their medicines, including administration routes and dosages, which are all very dependent on the individual's needs.

4. Patient profile monitoring

Monitoring the effects of treatments to ensure that they are providing effective, safe and appropriate use to the patient.

5.patient drug interviews

- **To obtain or verify a list of the patient's current medications**
- **Full dosing information for each medication**
- **Medication History**

6- pharmaceutical care Plan

The pharmaceutical care plan is a written, individualized, comprehensive medication therapy plan based on clearly defined therapeutic goals

N.B. The pharmaceutical care plan should be updated with each major change in patient status

The general steps involved in creating a pharmaceutical care plan are:

- **Create comprehensive patient database.**
- **Establish therapeutic goals.**
- **Specify monitoring parameters with end points and frequency.**
- **Assess for actual and potential drug-related problems.**
- **Document the patient's progress towards therapeutic goals.**

7. Drug product procurement & inventory management

Pharmacist responsible for procurement, distribution & control of all drug products used in the hospital

A. **Selecting sources of pharmaceutical products**

B. **Managing inventory (storage, shortages, samples, patient care area stock, controlled substances)**

C. **Inspecting storage areas & inventory items (outdated, storage, etc)**

D. **Returning recalled, expired & other unusable items**

Structure of the hospital pharmacy staff

A. Director of the pharmacy

Responsibilities include:

1- Maintains an adequate drug supply

2- Participates through the pharmacy and therapeutics committee in developing and updating of a current hospital formulary (a drug list selected by the committee and approved by the medical staff).

3- Establishes specifications for the procurement of drugs.

4- participates in orientation and continuing education of all persons responsible for preparation of sterile parenteral medications and fluids.

5- responsible for the preparation, sterilization and labelling of parenteral medications and solutions (e.g. Large volume parentrals LVP) manufactured in the hospital.

Responsibilities of the director (continued)

6- Responsible for any pharmaceuticals manufactured within the hospital .

7- Responsible for emergency drugs and antidotes throughout the hospital.

8- Keeps detailed records of controlled drugs within hospital.

9- Attends all meetings of the pharmacy and therapeutics committee s and implement their decisions

- **B- associate or assistant director of pharmacy**

Helps the director of the pharmacy in the operation of the pharmacy.

C- Staff pharmacists

Responsible for physician order review and filling, unit dose cart checking, parenteral admixture

- Contain an individual drawer or tray for each patient
- Each individual drawer in a medication cart is filled daily to meet patient medication needs.

D- Clinical Pharmacists

- **Play major role in therapeutic drug monitoring and evaluating drug therapy.**
- **Medication history-taking and medicines reconciliation.**
- **Assist physician to select drug product, dosage form and schedules.**
- **Patient education and counseling.**
- **Monitoring the patients total therapeutic drug level, effectiveness, side effects, toxicities, allergic drug reactions, drug interactions and appropriate patient outcome**
- **Provide drug information to the patient, medical & nursing stuffs.**

Hospital Pharmacy

Facilities required for the pharmacy department

Facilities required for pharmacy department

- Pharmacy location
- Pharmacy area
- Storage area
- Parenteral admixture
- Area for consultation
- Drug info. Resources
- Library and filing equipment
- Locked spaces for narcotics, controlled drugs and alcohol
- Refrigerator for thermo-labile products
- Book keeping supplies and related materials and equipment necessary for proper administration of department
- Office for the director of pharmaceutical services

Facilities (continued)

I. Location of the hospital pharmacy:

1. should be central to serve many departments.
2. Easily accessible by any person who make daily use of the pharmacy
3. Near to the elevator and outpatient section
4. The basement is not desirable place for a pharmacy

Facilities (continued)

II. Area or floor space

1. In 50-bed hospital: one room of an area for administration, dispensing, manufacturing and other services should not be less than 25 m^2. a separate room should be present for sterile products.

2. In 100-bed hospital: three rooms, one for admin., disp., manufact...etc and a store room. Also a separate room for parenteral preparations.

3. In 200-bed hospital: there should be:

a- a manufacturing room

b- a store room

c- a sterile product room

d- separate area for out-patient service.

e-a separate area for in-patient service

f- an office for the chief pharmacist

g- a separate area for drug information

Facilities (continued)

4. In 500, 1000 or more beds hospitals: there should be:

1) Waiting room
2) Office for chief pharmacist
3) Library and drug inform. centre
4) Office for the secretary and book keeper
5) In-patient dispensing lab.
6) Out-patient and consultation area
7) Manufacturing laboratory
8) Sterile product lab.

9) Formulation, control and research lab.
10) Store room
11) Radiopharmaceutical lab.
12) Alcohol and volatile liquid room
13) Narcotics, and controlled drugs
14) Analytical and quality control lab.

Facilities (continued)

III. Refrigeration facilities

The list of storage temperatures ;

1. Cold place: with a temperature not exceeding 8 ºC. (e.g. A refrigerator 2-8 ºC, freezer with a temperature between -20 to -10 ºC).
2. Cool place: a place with a controlled temp. Between 8- 15 ºC.
3. Room temp. Between 15- 30 ºC.

Facilities (continued)

IV. Ventilation

Air conditioning of the pharmacy is essential for:

1. preventing contamination with dust or dirt upon opening windows or doors.
2. Reducing temperature that may rise due to various equipment such as autoclaves and ovens
3. maintenance of temperature suitable for drug storage all year round.

V. Electric Lighting

Sufficient lighting must be provided.

Facilities (continued)

VI. Transporting items from the pharmacy to various departments in the hospital.

VII. Library and Info. Centre

VIII. Storage: drugs must be stored under proper conditions of: sanitation, temp., light, moisture, ventilation, segregation, security).

IX. Metric- apothecaries conversion charts.:

Table 5.2 Commonly Accepted Conversions Between Systems of Measurement

Metric System	Apothecary System	Household System
Solid Measure		
1 kg		2.2 lb
454 g	1	.0 lb
1 g = 1000 mg	15 gr (gr xv)	
60 mg	1 gr (gr i)	
30 mg	½ gr (gr ss)	
Liquid Measure		
1 L = 1000 mL		about 1 qt
240 mL	8 f oz (f oz viii)	1 c
30 mL	1 f oz (f oz i)	2 tbsp
15–16 mL	4 f dr (f dr iv)	1 tbsp = 3 tsp
8 mL	2 f dr (f dr ii)	2 tsp
4–5 mL	1 f dr (f dr i)	1 tsp = 60 gtt
1 mL	15–16 min (min xv or min xvi)	
0.06 mL	1 min (min i)	

X. Materials and equipment for administration:

(e.g. Book keeping, computers, messenger and delivery services etc.)

XI. Sterile area for parenteral medicine

preparation: (cleaning equipment such as laminar airflow hoods is necessary, microbiological monitoring should be at least every 12 months.

DRUG DISTRIBUTION AND CONTROL

OUTPATIENTS AND INPATIENTS

OUTPATIENT

- is a patient who is hospitalized for less than 24 hours.
- Or a patient who is not hospitalized overnight but who visits a hospital, clinic for diagnosis or treatment .

OUT-PATIENT SERVICES DIVISION

- Dispense out-patient prescriptions.
- Maintain prescription records.
- Provide drug consultation services

INPATIENT

- a patient who stays for one or more nights in a hospital for treatment
- An inpatient is "admitted" to the hospital and stays overnight, usually several days or weeks or years, sometimes until death.

IN-PATIENT SERVICES

- Provide medications for all in-patients of the hospital on a 24 - hour per day.
- Make sure the patient receive the right medication at the right time
- Offer personalized consultations on medications, interactions and side effects

IN-PATIENT PHARMACY :

- There are four systems in general use for dispensing drugs for inpatients.They may be classified as follows;

1. Individual prescription order
2. Complete floor stock system
3. Combination of individual &floor stock system
4. Unit dose system

1.INDIVIDUAL PRESCRIPTION ORDER SYSTEM:

It is a type of prescription system where the physician writes the prescription for individual patient, Nurse transcribes and sends to pharmacy and Pharmacy prepares prescription (2-5 day supply)

Advantages:

- All medication orders are directly reviewed by pharmacists.
- It provides clear control of inventory.

2.COMPLETE FLOOR STOCK SYSTEM:

Under this system ,the drugs are given to the patient through the nursing station according to the order of the physician

It involves the storage of pharmaceutical and over-the counter drugs in a nurse's station.

- Smaller version of pharmacy on nursing unit
- Nurses prepared drug for administration
- Pharmacist's primary role was to stock medications

- Nurse had primary responsibility for:

Drug selection (based on physician order)

Drug preparation

Drug administration

Pharmacist had little / no contact with physicians

- Nursing units, are inspected routinely by pharmacists (storage condition, dates, narcotics,) & reports given to pharmacy & nursing directors

In order to be considered floor stock, a drug must meet one or more of the following requirements:

1) A safe drug that is used regularly on a large percentage of patients.

2) A drug that must be immediately available in the event of an emergency.

3) A drug used by a specialized section such as anesthesia.

4) Not a controlled substance

Examples

Aspirin, parenteral salts (calcium, magnesium, potassium), adrenalin, antibiotics, anticoagulant, antihypertensive, and cardiovascular agents

Benefits (Adv.):

1. Reduced in-patient prescription orders

2. Reduction in number of pharmacy personnel required

3. The drugs are readily available for administration

Drawbacks:

1- Increase in chance of medication errors because it does not give pharmacists the opportunity to revise physicians' order

2. Increase in drug inventory

3. Increased workload on nurses

4. The choice of drug is made by the nurse without pharmacist involvement

N.B.

The floor stock system is used in small hospitals (not enough pharmacists)

The floor stock system are of 2 classes; free & charge

- **Free floor stock** consists of list of medications that are available on every nursing unit of the hospital for use at no specific charge to the patient

Inexpensive pharmaceuticals; alcohol, lotion, water for injection,

- **Charge floor stock** is medication available at each nursing unit & for which a charge is made to the patient

3.COMBINATION OF INDIVIDUAL AND FLOOR STOCK SYSTEM:

4.UNIT DOSE DISPENSING:

- Medications ordered, packaged and handled in multiples of single dose units containing a predetermined amount of drug or supply sufficient for one regular dose, application or use.
- Not more than 24 hours supply of doses should be available at patient care area at any time
- .N.B. Nurse administers, does not prepare medications

UNIT DOSE MODEL

- Physician initiates medication order
- Order sent / received by pharmacist
- Pharmacist determines appropriateness of order
- Medication order entered into pharmacy computer system
  - System checks allergies, interactions and dose limits
  - Subsequent doses sent via 24 hour cart-fill
  - Nurse receives medication from pharmacy
  - Administers dose to patient

ADVANTAGES :

- Better financial control.
- It prevents the loss of partially used medications.
- It does not require storage facilities at the nursing station.
- Reduction in chances of medication errors
- Efficient use of pharmacy and nursing staff
- Improved overall drug control
- Decrease Inventories on nursing units

DISADVANTAGES

1. Need larger number of pharmacists
2. Frequent ordering
3. Delays may occur in initiating new medication orders.

Methods of Unit Dose

Two methods of dispensing unit doses are:

- Centralized unit dose drug distribution system (CUDD)
- Decentralized unit dose drug distribution system (DUDD)

A.CENTRALISED UNIT-DOSE DRUG DISTRIBUTION SYSTEM(CUDD):

- All activities emanate from main pharmacy location
- Order receipt and processing, drug preparation, cart fill dispensing and delivery

Advantages:

- Resources are localized to single area
- Minimize drug inventory

Disadvantage:

- pharmacists not able to directly interact with physicians and nurses

B . DECENTRALIZED UNIT DOSE DISPENSING:

Decentralized pharmacies (satellites) throughout institution located in patient care areas

Most activities are based in satellites

Central pharmacy still operates. The main pharmacy in this system becomes a collecting, storage, manufacturing and packaging center serving all the satellites. This type of system can be used for a hospital with separate buildings

Advantages:

- Proximity to patient care areas allows for interactions with physicians and nurses in each satellite
- Can focus each satellite on specialty area (e.g. pediatrics)
- Increase in physician and nurse satisfaction
- Reduction in errors via clinical services