Drug distribution system

Drug distribution system

- Drug distribution is defined as, "Physical transfer of drugs from storage area in the hospital to the patient's bedside".
- Drug distribution system in India is still in the phase of archaeology.
- The overall drug distribution and utilization process in the hospital involves an infinite number of procedures, personnel, departments, equipments and storage facilities.
- In small hospitals, drugs are obtained from medical stores of the hospitals and are supplied to the wards, operational theatres, X-Ray and other clinics for the treatment of indoor patients (as well as out-patient dispensaries) by indent system "i.e. on written requisition slips from wards and theatres by nursing staff".
- Each ward in the hospital, regardless of its size or specialty, has a supply of drugs stored in the medicine cabinet.
- In the hospitals managed by the Central or State Governments, this aspect of pharmacy services like maintenance and supervision of medical stores and the dispensing and distribution of drugs is under the supervision of a Junior Medical Officer of the hospital.
- This involves two types of drug distribution. They are:

➢ In-patient distribution.

➢ Out-patient distribution.

OUTPATIENT DISTRIBUTION

- Outpatient refers to the patients not occupying beds in hospitals or in clinics, health centers and other places where out patients usually go for health care.
- The patient with minor and common illness goes to the O.P.D for consultation to the physician. After examining the patient, if the physician feels that there is no need of admitting the patient to the hospital ward, he prescribes the medicines and the patient is required to get the prescribed medicines from the hospital pharmacy and take home these medicines.
- The prescription written by the physician is brought to the pharmacist for compounding and dispensing. After careful examination of the prescription, the pharmacist carries out the compounding. The compounded medicaments are filled into suitable containers which are labelled properly. The pharmacist also calculates the price of the filled prescription which are handed over to the patient.
- No medicaments should be issued without the prescription.

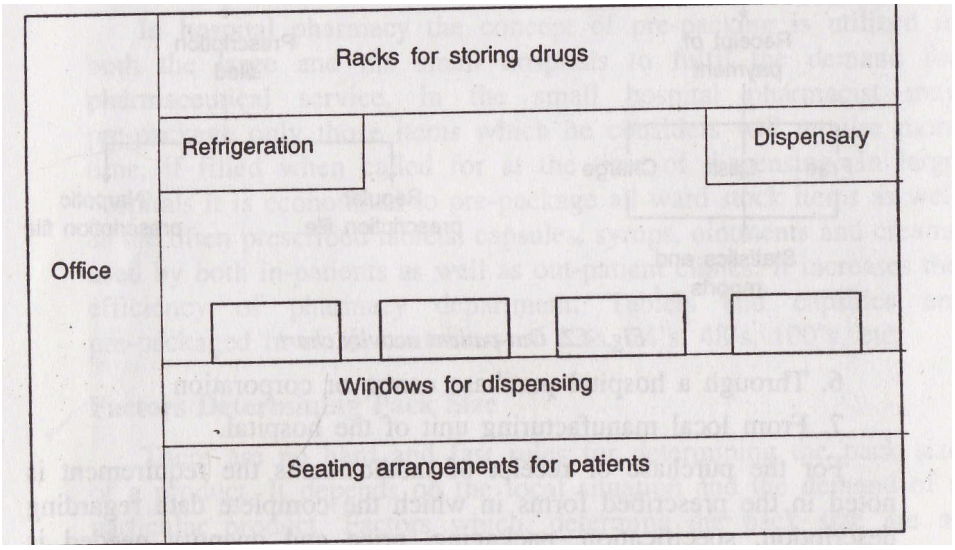
- After the issue has been made the quantities supplied must be recorded.
- Medicines are given to the out-patients from the pharmacy situated in the outpatient block.
- In short form the outpatient department was called OPD.

➢ **Categories of outpatients:**

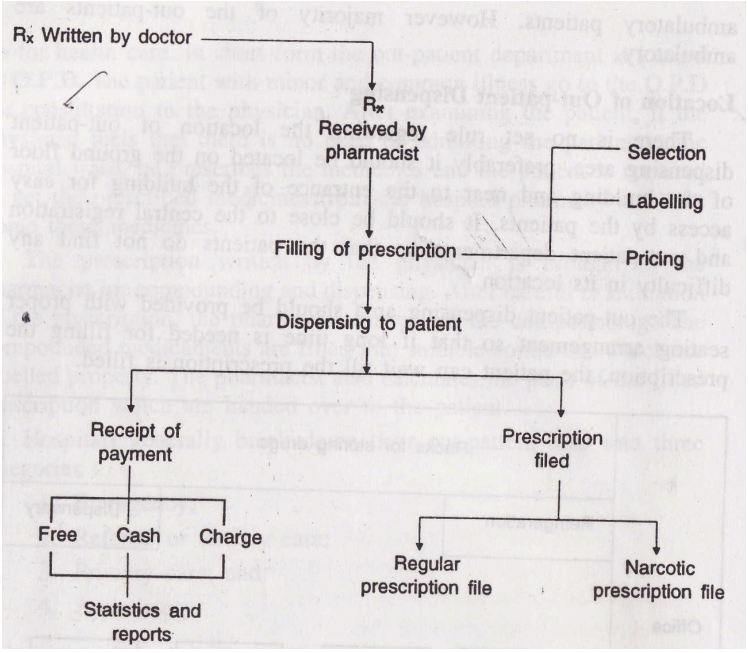
a) Emergency patients: A person given emergency or accidental care for conditions which require immediate medical attention.
   The patient suffers from serious health condition
b) Tertiary care patients / Referred: The patient is directed to outpatient department by his attending medical practitioner for specific treatment other than an emergency treatment.
c) Primary care patients: Primary care is provided in majority cases. Most primary care is used by patients who are ambulatory i.e are able to move about freely.

➢ **Location of out-patient dispensing:**

- It should be located on the ground floor of the hospital building and near to the entrance of the building for easy access by the patients. It should be close to the central registration and out-patient departments so that the patients do not find any difficulty in its location.
- The outpatient dispensing area should be provided with proper seating arrangement .
- The pharmacy receives its supplies from medical stores weekly but emergency supplies can be obtained at any time.



Layout for an OPD



Out-Patient activity chart

INPATIENT DISTRIBUTION

- The drug distribution to the inpatient department can be carried out from the outpatient dispensing area.
- The pharmacists involved in dispensing the drugs for outpatients can dispense drugs for inpatients too.
- If the work load seems to be heavy then additional employees can be employed. This method is found to be more economical.
- The pharmacist employed for drug distribution to the inpatient wards should be well skilled and qualified staff.

There are four systems in general for dispensing drugs for inpatients as follows;

a) Individual prescription order
b) Complete floor stock system
c) Combination of individual & floor stock system
d) Unit dose system

1. **Individual prescription order:** It is a type of drug distribution system wherein a physician writes the prescription for an individual patient who obtains the prescribed drugs from any medical store or hospital dispensary by paying own charges.
   This system is generally used by the small and/or private hospitals because of the reduced manpower requirements and desirability for individualised service.

➢ Advantage

- Less number of staff is required
- All medication orders are directly reviewed by pharmacists so there are less chances of medication errors.
- It provides the interaction of pharmacist, doctor, nurse & the patient.

- It provide clear control of inventory.

➢ Disadvantage

- There may be a possible delay in obtaining the required medications for administration to the patient.
- Increase in the cost to the patient.

2. **<u>Complete floor stock system:</u>** Drugs are stored at the nursing station and are administered by a nurse according to the chart order of the physician. Drugs on the nursing station are known as Floor Stock Drugs. Only commonly used drugs in considerable quantities are stocked on the floor.

➢ Advantages:

- The drugs are readily available for administration
- Minimum return of drugs
- Reduced in-patient prescription orders
- Reduction in number of pharmacy personnel required

➢ Disadvantages:

- Increase in chance of medication errors (not reviewed by pharmacist).
- Increase in drug inventory.
- Increase chances of drug deterioration due to lack of proper storage facilities.
- Increased workload on nurses.

➢ Floor Stock Drugs can be categorized as follows

a) Charge Floor Stock Drugs

b) Non-charge Floor Stock Drugs

a) <u>Dispensing of charged floor stock drugs</u>:

- These are drugs for which a patient is charged for every single dose administered to him.
- Selection of these drugs is made by PTC(Pharmacy and therapeutic committee).
- Charge floor stock drugs are stored at various nursing stations.
- Once the floor stock list is prepared, it becomes the responsibility of the hospital pharmacist to make the drugs available e.g., antiallergics (diphenhydramine HCI).
- The patients are charged mostly because of the high cost of such drugs. Such drugs include injections or other unit dosage forms.
- An envelope is used to dispense such drugs at nursing stations.
- Under this system, pre-labeled envelopes are filled with a predetermined quantity of specific drugs and are placed at the disposal of the nursing unit.
- When the drug is administered, the patient's name and room number is entered on the envelope and sent to the pharmacy for record.

b) <u>Dispensing non-charge floor stock drugs</u>

- These are medicaments placed at the nursing station for the use of all patients on the floor.
- There shall be no direct charge from the patients account for these drugs.
- These medicine are dispensed by drug basket method and mobile dispensing unit.

Drug basket method: Drug basket method is adopted where nurses check the medicines in all rooms and in the referigerator and prepare a masterlist for the pharmacy;

- ➔ Nurses fill a requisition form for delivery of drugs at their floor;
- ➔ When there is an empty container, the nurse places it in the drug basket;
- ➔ Once the procedure is completed the drug basket containing the empty containers and requisition for floor stock supplies is then sent to the pharmacy;
- ➔ Immediately in the morning, the pharmacy staff commences to fill each container and dispense the requested ampoules and vials as ordered;
- ➔ Once the basket is completed, it is delivered to the floor via messenger serving.

Mobile Dispensary Unit: It is a specially constructed stainless steel truck measuring 60 inches high, 48 inches wide and 25 inches deep. It is mounted on bottom tyres, four of which are swivel type. These mobile units help in delivering drugs to floors.

Difference between charge and non-charge floor stock system

Charge floor stock system	Non-charge floor stock system
The charges of drugs are made in the patients account after they have been administered.	The charges of drugs are not made in the patient account.
Every dose of the drug administered to the patient is charged.	This system charges are made indirectly to the patients.
These drugs are expensive and rarely used.	These drugs are cheap and mostly used tablets and capsule.
This drug list is not predetermined. Floor stock list is prepared which is sent to make the drugs available at all the nursing stations.	A predetermined list is prepared by nursing station.

3. <u>Combination of individual & floor stock system:</u>

- Falling into this category are those hospital which use the individual prescription or medication order system as their primary means of dispensing, but also utilize a limited floor stock.
- This combination system is probably the most commonly used in hospitals today and is modified the use of unit dose medications.
- This system is followed by all government hospitals and also private hospitals those run on the basis of no -profit and no loss.
- Individual prescription or medication system is followed as major means.
- Surgical items are given to the patients, who purchases and deposit those items in a hospital wards on rooms under the supervision of registered headness.

4. <u>Unit dose system:</u>

The unit dose system of medication distribution is a pharmacy-coordinated method of dispensing and controlling medications in health care institutions.

In unit dose dispensing the multiples of single dose administration of medication are prepared by the pharmacist which are ready for administration to a particular patient by the prescribed route and the prescribed time rather than supplying containers of drugs to nursing units where the nurse is required to prepare the drug for administration.

A single unit package is one which contains one complete pharmaceutical dosage forms, e.g., one tablet, one capsule or 10 ml oral liquid etc. Liquids are premeasured, powders are accurately weighed and diluted, parenteral preparations are suitably diluted and accurately measured into sterile syringes ready for administration.

➢ **Advantage**

- Patients receive improved pharmaceutical services 24 hours a day and are charged for only those doses which are administered to them.
- All dose of medication required at the nursing station are prepared by the pharmacy thus allowing the nurse more time for direct patient care
- Allows the pharmacists to interpret or check a copy of the physician's original order thus reducing the incidence of medication errors.
- Eliminates excessive duplication of orders and paperwork at the nursing station and pharmacy.
- Improved overall drug control and drug use monitoring
- A reduction in the size of drug inventories located in patient-care areas
- Contamination due to handling is eliminated.
- It eliminates wastages of drug and pilferage.
- More efficient utilization of professional and non- professional personnel is promoted.
- Extends pharmacy coverage and control throughout the hospital from the time the physician writes the order to the time patient receives the unit dose.
- Communication of medication orders and delivery systems are improved

➢ **Disadvantage**

- It requires more space since packaging material increases the bulk of the dosage forms.
- It requires an increased number of skilled and lay personnels in the pharmacy.
- The cost of medication is increased to the patient due to increased handling charges

➢ **<u>Methods of dispensing unit doses</u>**

a) Centralized unit dose drug distribution (CUDD)

- All in-patient drugs are dispensed in unit doses and all the drugs are stored in central area of the pharmacy and dispensed at the time when the dose is due to be given to the patient.
- Drugs are transferred from the pharmacy to the indoor patient by medication cards.

b) Decentralized unit dose drug distribution system (DUDD)

- This operates through small satellite pharmacies located on each floor of the hospital.
- The main pharmacy is for procurement, storage, manufacturing and packaging. It serves all the satellite pharmacies.
- This type of system is used in a hospital with several buildings.

- **Procedure:**

Patient profile card containing full date, disease ,diagnosis is prepared.

Prescriptions are sent directly to the pharmacist which are then entered in the patient profile card.

Pharmacists checks medication order for allergies, drug interactions, drug laboratory test etc.

Dosage schedule is made and coordinated with nursing personnel.

Patient profile card and prescription order is filled by pharmacy technicians.

Pharmacists then checks carts prior to its release.

The nurses administer the drugs and make the entry in their records.

Upon return to the pharmacy the cart is rechecked.

DISTRIBUTION OF DRUGS TO ICCU/ICU/NICU/EMERGENCY WARD

ICCU: The intensive Coronary care unit (ICCU) is a unit dedicated to the treatment of heart conditions such as coronary heart disease, heart attack, cardiac arrest and heart failure Critical care.

ICU: Intensive care unit, life support are provided in an intensive care Unit for Critically ill Patients.

NICU: Neonatal Intensive care Unit, also known as an intensive care nursery, is a unit specializing in care of ill or Premature newborn infants. The first 28 days of life are referred to as neonatal.

Emergency Ward: Also known as an accident and emergency department, emergency room or causality department. It is a medical treatment facility specializing in emergency medicine, the acute care of patients present without prior appointment, either by own means or by ambulance.

Distribution of Drugs to ICCU

Intenstive Cardiac Care Unit (ICCU) is a hospital ward specialized in the care of patients with heart attacks, cardiac dysrhythmia and various other cardiac conditions that require continuous monitoring and treatment. Most common drugs are:

1. Neuroleptic agents: Haloperidol chlorpromazine
2. Benzodiazepines: Midazolam, Lorazepam, Diazepam
3. Opioids: Morphine, fentanyl
4. Alpha agonist: Clonidine

Distribution of Drugs in ICU

Intensive care units provide services to severe or distress threatening illnesses and injuries like acute respiratory distress syndrome, septic shock, etc. Following drugs should be available under close

supervision of highly trained medical and paramedical staff. Emergency drugs adrenaline, salbutamol puff, atropine, aspirin, furosemide, hydrocortisone, insulin, lidocaine, Procainamide, and medical oxygen should be available in all intensive care units (ICU).

Distribution of Drugs to NICU

NICU means neonatal intensive care unit which is designed for babies within 30 days of birth, very small and premature or Neurologic ICU which is a specialized ICU for patients with serious nervous system diseases.

It is an acronym for either neonatal ICU or neurological ICU. Common medications are: Ampicillin, Gentamicin, furosemide, dopamine, azithromycin, Ferrous sulphate, Multivitamins, Cefotaxime, Caffeine citrate, Furosemide, Vancomycin, Surfactant, Metalopramide.

Distribution of Drugs to Emergency Wards

Emergency ward is a part of a hospital that provides 24 hour emergency care to patients who need urgent medical attention. Common medical emergency cases include: Bleeding, seizures, heart attack, stroke, breathing problem, eye trauma etc.

Common drugs are:

- Nitroglycerin - Angina pain
- Diphenhydramine - Allergic reactions
- Salbutamol, Epinephrine - Asthma
- Aspirin - Myocardial infarction
- Oxygen - Any emergency
- Glucose - Hypoglycemia, unconscious
- Other drugs include: Adenosine, Atropine, Calcium gluconate, Dopamine, Fentanyl, Hydralazine, Morprine, Naloxone, Phenobarbital, etc.

Cardiovascular Drugs

- Anticoagulant drugs-Warfarin an oral anticoagulant is used worldwide to prevent and treat thromboembolic disorders in the ICU
- Antiplatelet drugs-Clopidogrel
- Antiarrhythmic drugs- Metoprolol
- Vasoactive drugs-Vasopressin
- Statins-Simvastatin.

Automated drug dispensing system and devices

Automated dispensing devices are present in healthcare organizations. The transition of the pharmaceutical profession to direct patient care, changes in healthcare systems and cost- reduction pressures have promoted the use of automated dispensing devices. The system frees pharmacists from labour-intensive distribution functions. As early in California 1970, pharmacists were using automated technology to improve the efficiency of the drug distribution process. In this they first time used computers to improve the speed and accuracy of prescription label preparation and to quickly move

the patients order. Today, there are systems that automate the entire dispensing process. The pharmacist touches the product only when checking the prescription order before counselling the patient.

Computers are useful to maintain records in hospitals. Computers store and make the information available wherever necessary. Computers are used to maintain the detailed records of patients, physician information, their diagnosis and the medicine prescribed by them to patients. Computer can store data as -

a) Patient's information: Detail patient registration record is available to each clinic it includes; patient name, age, sex, weight, telephone no., allergies diagnosis and special precautions if any.
b) Physician information: It contains the name, address and telephone no. of the physician.
c) Drug reference file: It stores the prescribed drug information like drug name, their strength, their therapeutic dose, instruction for prescription, label etc.
d) Drug interaction file: This file store code for interacting drug pair, type of drug interaction, reference regarding interactions.

➔ Automated drug dispensing systems and devices provide computer controlled storage, and dispensing of medication.
➔ It also allows for immediate availability of newly prescribed medications.
➔ Pharmacy automation includes websites, dispensing robots, digital displays, prescription recording apps, etc.
➔ Automated medication dispensing requires delivery of medicines to patients through automation technology which runs automatically.
➔ Robotic dispensing machines eliminate the risk of human errors and meet the demands of high volumes of daily prescriptions in pharmacies. These robotic devices have a hopper system to feed the medication for scanning and verification. Then these medications are stored automatically in secure cabinets. Hence such systems increase the efficiency of the pharmacy department.
➔ It also minimizes dispensing errors and helps in better distribution of human resources in busy pharmacy departments. It reduces the workload. Automation process improves patient drug profiling, minimizes appropriate dispensing and distribution. These systems are common in some of the developed nations as they have multiple challenges which can be addressed through training of personnel.

DISTRIBUTION OF NARCOTICS AND PSYCHOTROPICS

Narcotics- The term “Narcotic” is derived from the Greek word “narcoticos” which means a state of lethargy or sluggishness.

- These are drugs that produce analgesia (Pain relief), narcosis (state of sleep) and addiction (physical dependence) on the drugs
- They are also known as opiods.
- Example- morphine, codeine etc

Psychotropic substances- The Greek word “Psycho” means “soul” and “trope” means “turning” i.e any drug affect mind (mind altering).These are the substances that affect behaviour, mood, thoughts or perceptions.

Example- alcohol, caffeine, nicotine etc.

Narcotic drugs and Psychotropic substance act 1985

The Narcotic Drugs and Psychotropic Substances Act, 1985, commonly referred to as the NDPS Act, is an Act of the Parliament of India that prohibits a person the production/manufacturing/cultivation, possession, sale, purchasing, transport, storage, and/or consumption of any narcotic drug or psychotropic substance.

Distribution of Narcotics and Psychotropics in hospital

The physician prescribes the medicines on the triplicate prescription pad (As per NDPS Act) to the pharmacy.
The following detail are to be verified
i) Date of narcotic prescription
ii) Name of the patient
iii) Address and contact detail of the patient(Out-patient)/Ward and floor number(In-patient)
iv) Name and quantity of drug
v) Frequency and route of administration
vi) Name of nurse administering drug(for In-patient)
vii) Name and registration number of RMP prescribing the narcotics medicine
viii) Signature of RMP prescribing the narcotic medicine

- After confirming all details on the prescription, narcotics are dispatched by the pharmacist to the patient(for out patient) and to the staff nurse/ doctor/ RMO (for in patient)
- When the dosage form of narcotic is tablet/capsule the number of units dispatched should be equal to the number of units prescribed.
- A bill is generated for the same and entries of dispensing to be done in “narcotic drug issue register”
- One copy of prescription stamped with dispatched medicine with signature of dispensing pharmacists to be given to patient(to be kept in patient file for In-patient) along with bill.
- Empty should be returned with a patient sticker attached to it. Documentation for returning the empty ampoule should be done in the “narcotic usage register” mentioning the pharmacist name to whom it was returned.
- Any excess ampoules not utilized for patients(after discontinuation of use or death of patient) are sent back to the pharmacy with proper documentation.

Storage of Narcotics and Psychotropics in hospital

- A separate license is required by the hospital for procurement, storage and distribution of narcotics and psychotropic drugs from the local excise department
- Drug storage rooms must have

→ Adequate lighting
→ Temperature of 25oC or below
→ Adequate shelving

→ Two RUM containers (returned of unwanted medicine)
→ Soap dispenser and paper towel holder

- The narcotic and psychotropic drugs must be stored in separate cupboard with double lock and key
- The key of the lock should be kept in the hand of two different people
- Other than narcotic drugs no item are permitted to be stored in the narcotic drug cupboard
- Narcotic drugs and psychotropic substances must be procured and stored in such a manner so as to prevent their falling into the hands of unauthorized person
- The storage area for the narcotic drugs and psychotropic substances may be opened and assisted by specific pharmacist in charge of MDS(main drug store) and nursing in charge of respective department