Hospital & Clinical Pharmacy

Important Question Answer

Q.1- Define & classify Hospital. Enumerate the various functions of Hospitals.

Ans. Hospital is defined as an institution that provides community health, where diagnosis, therapy, rehabilitation, training and social services are provided.

Classification: The hospital is classified on the basis of

1. Clinical hospital: This type of hospital is dependent on the basis of diagnosis and treatment.

a. Medicine. Eg: Psychiatric disorders, Leprosy etc.

b. Surgery. Eg: Orthopedic, gynecology etc.

c. Maternity.

d. Peadiatric

2. Non-clinical Hospital: This type of classification is dependent on the ownership of hospitals which may be of two types.

1. Public owner ship:

a. Central government eg: Railway hospital, defence hospital, AIIMS and PGI Chandigarh.

b. State Government eg: Civil hospital and JJ hospital Mumbai.

c. Local Self – Government Hospitals: These are run by Municipalities or Corporation, eg BMC hospital like Bhagwati Hospital in Mumbai.

2. Private Ownership: They are run by:

a. Trusts: The board of trustees manage the hospital, eg Jaslok Hospital, Mumbai.

b. Religious Bodies: eg Christian Medical College Hospital Vellore.

c. Limited Companies: These hospitals run by public limited company, eg: Apollo hospital.

3. Medicinal based hospital:

a. Allopathic Hospitals - eg: Ram Manohar lohia hospital, New Delhi.

b. Ayurvedic hospitals- in Jammu and Trivandrum.

c. Homoeopathic Hospital- eg Nehru Homoepathic hospital New Delhi.

d. Unani Hospital – eg: Hamdard dawa khana, Delhi.

e. A cupunture Hospital .

f. Naturopathy yoga hospital- Lucknow.

4. Size- based hospitals:

a. Large Hospitals (Beds 1000 or above): eg: J.J. group of hospitals Mumbai.

b. Medium Hospitals (Beds between 500-1000): eg: Bombay hospitals Mumbai.

c. Small Hospitals (Beds between 100-500)

d. Very Small Hospitals (Beds Less than 100)

5. Cost Based Hospitals:

a. Elite Hospitals.

b. Budget Hospitals.

c. Private Hospitals/Nursing Homes.

d. Teaching Hospitals.

Functions:

1. It provides diagnosis and treatment of diseases of the patients.

2. It acts as immunization Centre.

3. It lowers the incidences of disease through early detection & treatment.

4. It stimulates the growth of medical science, Doctors & nurses receive their training in large teaching hospitals.

5. It provides advice on matters like family planning, sexually transmitted diseases, AIDS.

6. It provides facilities for hospitalization.

7. It acts as a link between general public and policy makers.

Q.2 Write in detail about organization of hospital.

Ans. The successful hospitals are based upon good community oriented planning & good design & construction & good administration.

Its organization is based upon the following principles:

Team co-ordination: An individual supervises a professional team or Medical /Paramedical staff. The services are integrated and coordinated.

Division Of services: An observer looks after working system. Activities analysis is an important decision to shape the organization. A hospital undertakes a number of activities – diagnosis, treatment or therapy, rehabilitation education & preventions.

Homogenous Approach: A hospital caters to both ambulatory and bed patients & Inpatients. Evaluation of Services: Services provided by the hospital should rate in terms of quality & adequacy for meeting the patients & community requirements.

Administrative Responsibility: The relation amongst the various people & tasks in a hospital must be carefully maintained. Responsibility should be assigned appropriately.

Budget Preparation & financing: Large hospitals treat almost 15 lakhs patient per year & per form 18 thousand major surgeries & 33 thousand minor surgeries. Their yearly budget is about Rupees 16-18 cr. Many hospitals have their own finance.

Talent Search: A hospitals should be staffed by competent medical experts & non-medical staff. The organization should formulate a program to attract good physician & surgical specialists as well as to attract the patients.

Governing Body: Each hospital has top management to decide its course of action & policy guidelines & to exercise overall supervision & control.

Q.3 Write a note on Primary Health Centre.

Answer - Primary Health Centers caters to the health needs of the rural areas. They are not self-sufficient. They depend upon the facilities provided by civil hospital (District H.Q. Hospital) or Taluk Hospitals. Family welfare activities are now assigned to family welfare center, attached to PHC.

The following are the required personnel of a PHC.

Medical Officer ------ 1

Block Extension Educator ------ 1

Pharmacist ------ 1

Family Welfare field Workers ------ 3

Accountant – cum- clerk ------ 1

Auxiliary Nurse Midwife ------ 4

Health Visitor ------ 1

Female Assistant ------ 7

The Mukherjee Committee recommended for the following personnel:

Basic Health workers ------ 8

Health inspectors ------ 2

Clerk ------ 1

Lab technician -------- 1

Q.4 Define Hospital Pharmacy. Write the functions and objectives of hospital pharmacy.

Ans. Hospital pharmacy is a department in which the drug are procured ,stored , compounded checked for quality, dispensed , manufactured packed and distributed to in patients and out patients by competent and legally qualified pharmacists.

Function of hospital pharmacy

- Dispensing of drugs, chemicals and pharmaceutical preparations.
- Preparation and sterilization of injectable drug when manufactured in the hospital.
- The filling and labeling of drug containers issued to other department from which medication is to be administered.
- Necessary inspection of all pharmaceuticals supplies in other department.
- Maintenance of an approved stock of antidotes and other emergency drugs.
- Dispensing of all narcotic drug and alcohols and the maintenance of perpetual inventory control.
- Collection and circulation of information regarding the drug to physician interns and nurses.

▪ Maintenance of the facilities of the department.

Objective of hospital pharmacy

• To teach hospital pharmacist, the ethics for hospital pharmacy to assume responsibility for for professional practice.

• To ensure the availability of the right medication at reasonable cost.

• To develop the administrative or management skills and other aspects essential to the hospital pharmacist in his role as a departmental head.

• To attract a greater number of qualified pharmacists in hospital practice.

• To utilize the resources of hospital to help in improvement of the department and profession as a whole.

• To co-ordinate and Co-operate with other departments of a hospital.

Q.5 Describe the location and layout of hospital pharmacy.

Answer - Location and Lay-out

• Hospital pharmacy should be located in place easily approachable for all departments who avail its services.

• Preferably it should be located on the ground floor to avoid the inconvenience to the person utilizing the services of the pharmacy.

• The sub-departments like inpatient and outpatient, manufacturing, dispensing, storage etc. Should be so laid out that there is continuous flow of men and material. The sub- departments should be vertically separated.

• Outpatient pharmacy should be well furnished to give pleasant look.

• It should be provided proper seating facilities for waiting patient.

• It should display educative or informative posters on health for reading to pass leisure time of waiting.

Q.6 Discuss the different methods of drug distribution systems in India.

Ans.

There are two types of drug distribution system in hospitals

(A) The drug are distributed to patients in wards (Indoor Patients)

(B) The drugs are distributed to outdoor patients.

Drug distribution system to Indoor Patients:

Generally four system of drug distribution are in use in different hospital in India.

a. Individual prescription order system

b. The complete floor stock system

c. Combination of Individual drug order and floor stock system

d. Unit dose dispensing system

Individual Prescription Order System: It is an old system but still followed in small sized private hospitals. In this system doctors write a prescription and ask the patient to get the medicines from licensed medical store. This system is not only costly because one has to pay the retail price but there is a lot of time lost as the patients relations even if they are available, have to run about to get the same which could easily have been kept in the hospital and supplied.

Advantages:

▪ Reduction in number of staffs in the hospital.

▪ The prescription is directly reviewed by the qualified pharmacist at medical store.

▪ It provides interaction of doctors, pharmacists and patients.

The complete floor stock system: - The system is most often used in private hospitals in India. The drugs are stored in the pharmacy stores supplied to the wards or rooms and kept under the supervision of registered nurses at nursing station. There are two types of drug.

Charge drugs: - These are costly drugs and obtained from the pharmacy store upon the receipt of prescription or medication order for the individual patient .the cost of the drugs is billed in the patient account for the charging.

Non Charge drugs: - Generally these are cheaper and commonly used drugs .the cost of these drugs is not directly entered in the patients account but included in to the perday cost of hospital ward or room.

Advantages

• Easy and prompt delivery of the required drug.

• Elimination of drugs return.

• Reduction in the pharmacy staff members required.

Disadvantages:

• There are greater chances of drug interaction or adverse drug reaction as the prescription is not reviewed by the pharmacist.

• Proper storage facilities inward is required to avoid deterioration of drugs which may increase the cost.

• Greater load upon the nurse time

Combination of Individual drug order and floor stock system: - This system is followed in the government and also in private hospitals who run on the basis of no profit and no loss. Individual prescription or medication system is followed as a major means. Requirement of drugs surgical item are given to the patient who purchase and deposit these items in hospital wards or rooms under the supervision of registered nurses. In addition to the above system limited floor stock system is also used.

Unit dose dispensing system: - The concept of unit dose dispensing is not new in pharmacy as single dose disposable syringes of medications and single unit foil or cellophane wrapped capsules and tablets are available in the market since last so many years. All though unit dose dispensing is a pharmacy job but it cannot be performed in the hospital without the co-operation of nursing administrative and medical staff.

Hospital pharmacist has to educate the other staff members involved in unit dose dispensing about the concept of this system.

Advantages

❖ Patients receive better services and are charged for only does which are administered to them.

❖ Nurses get more time for patient care as all doses of medication are prepared in pharmacy.

❖ Better financial control.

❖ It prevents the loss of partially used medication.

Types of unit dose dispensing system: The unit dose dispensing concept may be introduced in to the hospital in either of two ways.

i. Centralized unit dose drug distribution system.

ii. Decentralized unit dose drug distribution system.

• **Centralized unit dose dispensing: -** In this system all inpatient drugs are dispensed in unit doses and all the drugs are stored in main pharmacy and dispensed at the time, the dose is due to be given to the patient.

• **Decentralized unit dose dispensing: -** Small pharmacy often called satellite pharmacy is set up on each floor of the hospital. The main pharmacy procures stores, manufactures and package of the drug. It supplies the drugs to the satellite pharmacies upon the receipt of medication order this type of system can be used for a hospital with separate building.

Q.7 Write a note on Satellite pharmacy

Ans. Satellite pharmacies are sub-pharmacies which receive their supplies from the main pharmacy. The concept of satellite pharmacy is being adopted in very big hospitals which have multi-storeyed separate buildings in a single premises.

Advantages:

i) Efficiently drugs can be distributed

ii) Time of drug distribution could be reduced

iii) Errors in drug distribution could be stopped

Disadvantages:

i) Effect on the budget of hospital

ii) Additional manpower is required.

Q.8 Write a note on Hospital formulary

Ans. Hospital formulary can be defined as an important document of hospital containing a collective list of drugs. This book is used extensively by the doctors.

The hospital formulary is to be revised periodically and should reflect the current aspects of the clinical judgement of the medical staff.

The hospital formulary system is a powerful tool for improving the quality and controlling the cost of therapy.

The PTC of the hospital is the in-charge of its preparation and revision.

Objectives/Significances of Hospital formulary system:

1. To provide the information on which drug products have been approved for use.
2. To furnish the staff the basic therapeutic information about each approved drug product.
3. To deliver information on hospital policies and procedures pertaining to the use of drug.
4. To elicit special information of drug about drug dosing, rules and abbreviations used in a hospital.

Q.9 Write a note on bed side pharmacy.

Answer. Bed side Pharmacy: Hospital pharmacist should be more and more patient oriented. He should work in closed association with nursing and medical staff.

Active participation at the ward level by the hospital pharmacist is needed during his ward visit a pharmacist should give ward visit and pass important instruction regarding the drugs to medical or nursing staff. While rendering the services of bed pharmacist, he needs not to given up his skill of compounding and dispensing drugs.

Q.10 Define and classify surgical dressings.

Ans. Surgical dressings: The surgical dressings are protective coverings which have absorbent and supporting property, use to cover the wound so that it helps in quick healing of wound.

Classification:

1. Surgical fibre – Absorbent cotton
2. Fabrics:

a. Primary wound dressings: These dressings are applied directly over the wound surface.

- Gauze compress
- Petrolatum impregnated gauze
- Adaptic non-adhering dressings
- Transparent non-adhering films

b. Surgical gauze: or absorbent gauze is an absorbent material, possessing sufficient tensile strength for surgical dressing.

3. Bandages: These are prepared in various widths and in one continuous length without any joint or cut.

a. Plaster of Paris bandage

b. Cotton crepe bandage

4. Adhesive tapes. The surgical adhesive tapes are of three types:

a. Permeable : It is used to secure dressing

b. Semi permeable: It is used to cover possible sites of infection and appliances

c. Impermeable: It is used for secure dressing where exclusion of air, water and water vapour is required.

Q.11 Give an account on the manufacturing steps involved in large volume parenteral.

Ans. Large Volume Parenteral (LVP) are those dosage forms which are filled in large quantity in single dose containers holding 100 ml or more and are intended for intravenous use.

Manufacturing steps involved in the preparation of dextrose solution:

• Weigh 25 g of dextrose in to the volumetric flask and add sufficient quantity of water for injection to make up to 500 ml.

• The solution should be clear. If not, filter the solution using filter paper.

• Fill the clear filtered solution in to clean and dry glass bottles. Fit these bottles with rubber closures.

• Pack the filled glass bottles in an autoclave for sterilization.

• Sterilize the batch at 1210C for 20 minutes.

• Switch off the autoclave and allow it to cool until the pressure come down to zero, before opening the autoclave to remove the sterile dextrose solution.

• This solution should comply with the specifications laid down by the Indian pharmacopoeia.

Q.12 Define clinical pharmacy. Write the functions of clinical pharmacy.

Answer. Clinical pharmacy is a branch which involves the participation of clinical pharmacist in drug therapy decisions in patient care areas.

In the clinical function, pharmacist is often called as clinical pharmacist, advises the physician about the dosage regimen and possible drug interaction

Functions of clinical pharmacy

✓ Preparation of patient medication history chart.

✓ Monitoring the patient's response to the current medication is done in order to maximize benefits.

✓ It involves in increasing the knowledge about the diseases and their drug therapy.

✓ Participation in medication emergencies.

✓ Management of chronic disease.

✓ Clinical pharmacist participates in clinical drug investigation along with other medical staff members.

✓ Clinical pharmacist is involved in drug administration and drug distribution in the patient care area.

✓ Clinical pharmacist involves in detection and reporting of adverse drug reaction and drug interaction.

✓ Clinical pharmacist involves in conduction of drug use reviews and participation in patient care audits.

Q.13 Write the role of pharmacist in improving compliance.

Answer. Role of pharmacist in improving compliance

Generally both the physician and pharmacist have the opportunity to interact directly with the patient and give proper explanation about the drug therapy. The effective communication will encourage the compliance. The pharmacist generally has a better opportunity to encourage compliance since His advice accompanies the actual dispensing of the medication and He is usually the last health profession to see the patient prior to the time the medication is to be used.

- Patient compliance with drug therapy is mainly dependent upon the effective communication of instruction necessary for correct use of medication or counselling.
- It is the part of the clinical pharmacy practice to give maximum benefits to the patient
- Prophylactic treatment is required in the absence of symptoms eg: tuberculosis.
- The drug in use have a low margin of safety.
- Premature withdrawal from treatment causes serious Consequences.
- Long term therapy is indicated for a chronic disease
- The basic information which are given by the pharmacist during counselling include.

- The purpose of medication.
- Time of drug intakes.
- Common side effects.
- Method of administration
- Storage advice.
- Specific activities to be avoid.
- About interaction with food, alcohol and smoking adverse drug reaction.

Q.14 Write a note on medication history.

Answer. Medication history: - An accurate and complete patient medication history is beneficial to the physician in making decision on current treatment.

- The medication history alerts to previous adverse effects, potential adverse reaction or allergies or possible interaction affecting the validity of laboratory tests.
- In order to obtain the necessary information in comprehensive form the pharmacist should conduct the interview in predetermined systematic and flexible way.
- The pharmacist should start the interview by introducing himself and explaining the purpose of the interview.
- Get the name, address, age etc. of the patient and then collect the past history. Direct or indirect question can be asked around main areas such as prescribed medication, self-medication, and allergies sensitive or undesirable effect of the drug compliance to prescribed medication, smoking, drinking and eating habits.
- The terminology used in the patient interview should be easily understandable by the patient e.g.: heart burn, indigestion.
- Towards the end of the interview when the pharmacist has the patient confidence question can be asked to ascertain patient's medication compliance pattern.
- This may be valuable information which could be help in the treatment of the patients. All the information collected from interview are then recorded in the patients medication interview form and transferred to physician.

Q.15 Define central sterile supply department (CSSD). Describe the location of CSSD.

Answer. The central supply department of a hospital is defined as centralized department which provides professional supplies and other equipment to all specialized department. This includes both sterile and non-sterile items. Specialized department includes all nursing wards, clinics, laboratories and operation theatre.

Central sterile services is restrictive, and it is an old concept in which it supplies the re-usable material only.

It has wash room sterilizing facilities.

Location of central sterile supply department.

- Central sterile supply room should be centrally located. It should be situated near to area from which it receives most of the supplies and also from department which are its largest consumers.

- If central sterile supply department is controlled by the pharmacy department then these two units should be physically combined or at least adjacent to one another for better supervision by pharmacy personnel.

Central sterile department has a layout as shown it consists of a services of working station in dirty areas which are separated from clean area by autoclaving and sterilizing equipment. The number, types and size of working station depends on size , nature of hospital the quantity of disposable materials used , the type of sterilization required and whether the hospital manufacture sterile intravenous fluid or procures from outside . Non sterile items from one end of the department pass through various working stations and sterilized and finally st ored in sterile storage area.

Q.16 Write the composition and functions of PTC.

Ans. The hospital as an organisation respond to rational use of drugs by creating a mechanism called as Pharmacy and Therapeutic Committee, which formulates policies regarding therapeutic use of drugs.

Composition:

a. At least three physicians.

b. A pharmacist

c. A nurse and administrator of the hospital

The administrator acts as a ex-officio member and physician is appointed as chairman of the committee and pharmacist as the secretary.

Functions:

a. It develops, compiles and rectifies the hospital formulary system sponsored by the medical staff.

b. The committee minimizes duplication of the basic drug products.

c. It reviews and monitors adverse drug reactions.

d. It helps in the development of training programmes for professional staff in drug use.

e. It establishes procedures for cost effective drug therapy

f. It advises the pharmacist regarding drug distribution and control procedures.

g. It participates in quality assurance activities related to distribution, administration and use of medications.

Q.17 Describe the role of PTC in advising drug safety.

Answer. Role of PTC in drug safety

- Are the pharmacist and his assistant adequately qualified?
- Is there a practice of dispensing by non-pharmacists?
- Is the main power of hospital pharmacy adequate justice to the work load?
- Does the hospital provide adequate safety, work space and storage facilities for the pharmacy?
- Does the pharmacy have equipment necessary to carry out the modern practice of pharmacy with adequate safety?
- Does the hospital has an Automatic stop order regulation for dangerous drugs eg: narcotics
- Does the hospital have a firm policy?
- Does the hospital has a drug formulary?

Q.18 Write the role of PTC in monitoring of adverse drug reaction.

Answer. Role of PTC in adverse drug reaction monitoring

i. Since drug therapy is becoming complex and incidence of adverse reaction are increasing. This problem can be tackled at two levels

ii. How to prevent the adverse reaction and once they occur how to treat them The PTC, therefore develops a reporting system for this purpose.

iii. The adverse drug reaction reports consists of names of the drugs, routes of administration , the date of starting and ending treatment ,the indication for which the drugs were used and adverse reaction noted for them . And the steps taken to treat these side effects. The ward or nursing station transmits this report to the chairman of PTC.

Q.19 Define and classify poison.

Answer. A poison can be defined as a chemical substance which when administered, inhaled or swallowed is capable of producing lethal (pranghatak) effect.

Human poisoning can be divided in to two types:

1. Acute poisoning: It may be self or accidental poisoning. Symptoms appear suddenly soon after the consumption of poison. These symptoms increase in severity and may cause death if not attended.

2. Chronic poisoning: Symptoms develop gradually like malaise. There is complete disappearance of symptoms on the removal of suspected food, medicine or fluid poison.

Classification of poison:

Poisons are classified generally on the basis of their mode of action:

1. Corrosives: They produce inflammation and acute ulceration of tissues. The symptoms are pain in throat and stomach with odour of acid.

Examples-

a. Strong acids like sulphuric acid, nitric acid and hydrochloric acid

b. Organic acids like oxalic acid and carbolic acid

c. Strong alkalis like caustic soda and caustic potash

2. Irritants: they produce intense pain, vomiting, usually purging and finally collapse (sudden failure of the vital function).

Examples-

a. Metals like lead, arsenic, mercury

b. Non-metals like bromides, iodides, boron

c. Organic vegetable poisons like ergot, aloes, castor seeds

d. Organic animal poisons like snake venom, scorpion venum and poisonous insects.

3. Neurotics: These poisons act primarily on the CNS. The common symptoms are headache, giddiness, delirium (mansik gadbadi), stupor (unconsciousness), coma sometimes convulsions and paralysis. Death usually comes from failure of respiration.

Examples-

a. Poisons acting on cerebrum – Alcohol, ether, chloroform etc

b. Poisons acting on spinal cord – Nux vomica

c. Poisons acting peripherally – Conium and curare.

Q.20 Describe the general procedure for the treatment of poisoning.

Ans. There are five basic principles for the treatment of poisoning:

i) To remove unabsorbed poison from the body.

ii) Use of antidote

iii) To excrete absorbed poison

iv) To treat the general symptoms of patient

v) To maintain the patients general condition

i) To remove unabsorbed poison from the body:

• If the patient has inhaled the poison like carbon monoxide he must be immediately moved to fresh air. Artificial respiration should be given immediately

• If the poison has entered through contact with skin, eye or wound then wash out the poison with plain warm water

ii) Use of Antidote:

Antidotes are the substances which neutralizes the effect of poisons. They are of four types:

• Physical antidote (e.g., fat, oil, egg albumin, banana, charcoal)

• Chemical antidote (e.g., magnesium oxide, calcium oxide, tannins.)

• Physiological antidote (systemic antidote) e.g., Dimercaprol, chloroform, caffeine.

• Universal antidote (e.g., Activated charcoal, Magnesium oxide, tannic acid)

iii) To excrete absorbed poison

• Forced diuresis

• Use of cathartics

• Haemodialysis

• Use of hot packs

iv) To treat general symptoms of patients:

Symptoms	**Treatment**
Pain	Morphine
Circulation failure	Cardiac stimulant
Respiratory failure	Artificial respiration
Dehydration	Saline infusion

Q.21 Explain the symptoms and treatment of heavy metal and barbiturate poisoning.

Answer. There are few metals that cause poisonous effect in our body; such as arsenic, lead, mercury, antimony etc.

Arsenic poisoning:

Symptoms:

- Gastro intestinal tract discomfort
- Burning pain on lips, stomach etc.
- Vomiting with stomach content followed by greenish and blackish mucous fluid.
- Vomiting later on followed by diarrhoea
- Muscle cramps and convulsions.
- Visual disturbances

Treatment:

- Gastric lavage with warm water
- Emetics like mustard and zinc sulphate are used
- Use of antidote like ferric oxide
- Dimercaprol injection intramuscularly for 2 days.
- Morphine can be used to abolish pain.

Barbiturate poisoning:

Symptoms:

- Excitement
- Restlessness and mental confusion
- Slowed speech and delirium
- Respiratory depression
- Hypotension and muscular weakness
- Coma, finally death due to respiratory failure.

Treatment:

- Gastric lavage by using potassium permanganate solution
- Hypertensive like metarminol intravenously may be given
- Use of analeptics which stimulate CNS
- Use of osmotic diuretics.

Q.22 Define and classify drug interaction. Explain the mechanism of drug interaction

Answer. A drug interaction may be defined as a situation in which the effects of one drug is altered by prior or concurrent administration of another drug.

Classification

Drug interactions are classified in the following ways:

1. Consequences Wise:

a. Beneficial interactions:

examples

• Combination of sulphamethoxazole with Trimethoprim is used to enhance the antibacterial effect or therapeutic effect of either drugs.

• Combination of carbidopa with levodopa useful in Parkinsonism.

• Various types of cytotoxic drugs are used in cancer therapy to increase therapeutic efficacy.

b. Adverse drug reactions: results with drugs that antagonise each other.

E.g. morphine and nalorphine (opposite physiological action),

Cholinesterase inhibitors and atropine (opposite physiological action).

2. Site wise:

a. External: There are many physical and chemical incompatibilities when drugs are mixed in infusion, vials, syringes, etc. precipitation or inactivation may occur.

b. Internal: In these adverse reaction is at body site or system (e.g. GIT, liver) or site of drug action (e.g. cell membrane, receptor)e.g. atropine competitively blocks Pilocarpine actions at muscarinic receptors, penicillin's cause the inactivation of gentamicin if given together in intravenous fluid.

3. Mechanism wise: Drug interactions can be classified on the basis of their mechanism as follows:

a. Pharmacokinetic drug interaction: It occurs as a result of altered drug absorption, distribution, metabolism and excretion.

b. Pharmacodynamics drug interaction: In these interactions drugs having similar or opposite pharmacological effect are administered concurrently where responsiveness of the tissue to one drug is altered by another.

Mechanism of drug interaction:

1. Pharmacokinetic Drug Interaction:

a. GIT Absorption alterations:

i. Alteration of pH

ii. Complexation and adsorption

iii. Gastric motility changes

iv. Inhibition of G.I.T enzymes

b. Distribution alteration

i. Displacement from protein binding site

c. Metabolism alteration

i. Stimulation of metabolism

ii. nhibition of metabolism

d. Excretion alteration

i. Urinary pH changes

ii. Interference with urinary excretion.

2. Pharmacodynamics interactions:

a. Drugs having opposite pharmacological effects

b. Drugs having similar pharmacological effects

c. Alteration of electrolyte levels

d. Interactions at receptor sites.

Q.23 Write a note on drug food interaction.

Answer. Drug-Food Interactions:

Food may affect the absorption of drug. It may be due to:

a. Dilution of the drug

b. Adsorption (adhishoshan) or complexation of drug.

c. Change in gastric emptying.

Examples:

1. Milk reduces absorption of tetracycline by forming an insoluble complex.

2. Fatty food delays gastric emptying time and alters rate of absorption.

3. Absorption of some drugs reduces in presence of food. E.g. Ampicillin, Rifampicin, Isoniazid etc.

4. Absorption of drugs like Riboflavin, Spiranolactone, and Carbamazepine etc. increases in presence of food.

5. MAO inhibitors, if are administered with tyramine containing food like cheeses, chocolate, alcoholic beverage, liver etc. there will be severe hypertension which can result in death.

Q.24 Define 'Drug Dependence'. Explain the treatment of morphine addiction.

Answer.

Drug addiction is a state in which an individual is incapable of maintaining normal physical and mental functions without the presence of the drug. The W.H.O has now replaced the term addiction with 'Drug Dependence'.

The characteristics of drug dependence are:

- An over powering desire to take the drug

- A tendency to obtain the drug by any means
- A tendency to increase the dose2
- Harmful effect to the individual society.

Morphine Addiction:

Morphine is a narcotic drug. The abuse of narcotics results in a syndrome like constipation, excitement, drowsiness, swelling of hands and feet, pin point pupils, impotence in male.

Treatment:

The purpose of treatment is not only to secure the patient but also to obtain complete abstinence of drug. It involves

a. Pharmacological approach: A narcotic antagonist like naltrexone is given orally. It blocks the action of opiates.

A substitute like methadone at a dose of 30 mg in divided dosage is given for initial 3 days. Then the dose is reduced to 10 mg / day.

b. Psychological approach: Apart from the drug treatment, moral and social counselling is desirable in such conditions.

Q.25 Define the term 'Adverse Drug Reaction'. Write a note on 'Teratogenicity.'

Answer. The WHO defines an Adverse Drug Reaction as 'Any noxious and unintended effects of drugs which occur at dosage normally used in man for the prophylaxis, diagnosis, or therapy of disease or for the modification of physiological function.'

The administration of certain drugs to pregnant woman especially during the first trimester of pregnancy results in foetal abnormalities such drugs are called as teratogens and the process is called as Teratogenicity.

Teratogens act by two ways:

1. Act directly on the foetus: During the organogenesis phase i.e. first 16-58 days of developing embryo, drugs like thalidomide, methotrexate, etc directly on the foetus, by affecting the cell division, protein synthesis and DNA synthesis

2. Act indirectly:

a. On the placenta: Vitamin –A and its several analogues, after the normal processes; leads to deficiency of critical substances.

b. On the uterus: Vasoconstrictor act on the uterus by reducing the blood supply and causes foetal anoxia

Q.26 Define and classify Drug-Drug Interaction with examples.

Answer. A drug interaction may be defined as a situation in which the effect of one drug is altered by prior or concurrent administration of another drug.

Drug-Drug Interaction:

(A). Analgesic Drug Interactions

Sl.no	Combination	Mechanism of Interaction	Clinical significance
1.	Aspirin and Probenecid	Both compete for same binding site on plasma albumin	Uricosuric action of probenecid is decreased. Hence, Aspirin should not be given with probenecid in Gout
2.	Aspirin and Heparin, Warfarin	Aspirin potentiates the activity of anticoagulants by interfering with binding site and decreasing platelets activity	Chances of mucosal bleeding are very high. E.g. Nasal and Gastric. During oral anti-coagulant therapy, aspirin should be avoided.

(B). Cardiovascular drug interactions:

Sl.no	Combination	Mechanism of Interaction	Clinical significance
1.	**Cardiac glycoside** Digitalis and Antacids	GIT absorption ofmcardiotonics is impaired by Almunium hydroxyl gel or Magnesium trisilicate	Therapeutic level of digoxin may not be achieved
2.	**Antihypertensive** Propranolol and Antidiabetics	Inhibits conversion of glycogen to glucose from liver resulting in to hypoglycaemia	Hypertension and bradycardia during hypoglycaemia. Physician should reduce dose of antidiabetic

(C). Diuretic Drug Interaction:

Sl.no	Combination	Mechanism of Interaction	Clinical significance
1.	Frusemide, Thiazides and Antidiabetics	The action of sulphonyl ureas is antagonised, the loss of potassium may also be responsible for this effect.	Patient should be given potassium supplement.
2.	Thiazides and Antihypertensives	Diuretics potentiates the effect of Antihypertensives drugs	This combination is valuable for the physician.

Q.27 Give the normal values and clinical significance of the following parameters. a) Haemoglobin value, b) Red Blood Corpuscles [RBC], c) White blood [WBC], d) Differential leucocyte Count, e) Erythrocyte Sedimentation rate [ESR], f) Coagulation time /Clotting time, g) Blood Sugar.

Answer. a) Haemoglobin value:

Normal range

Male: 13.5-14.5%

Female: 12-14% Infants: up to 13%

Clinical Significance: - Hemoglobin value below normal range causes Anemia & above normal range polycythemia.

b) Red Blood Corpuscles [RBC]:

Normal range

Male: -4.5-5.5 millions/cmm

Female: - 3.5-5.0 millions/cmm

Children: -4.0-5.5 millions/cmm

Clinical Significance: - Above normal range – polycythemia & below normal range- Anaemia

c) White blood [WBC]:

Normal range: 4000-11000 cells/cmm

Clinical Significance: - Above normal range – Leukocytosis & below normal range- Leucopenia

d) Differential leucocyte Count

Various type of white blood cells are as follow

Neutrophils - 60-70%

Eosinophil - 1 to 4%

Basophils -0- 1

Monocytes – 5-10%

Lymphocytes – 25-30%

Clinical significance: - A high neutrophil count indicates the severe infection Eosinophil are high in warm infestation and allergic conditions. Basophils increase in granulocytic leucopenia.

Lymphocyte number is high in whooping cough. Monocytes increase in bacterial infection & leukemia.

e) Erythrocyte Sedimentation rate [ESR]: -

Normal range.

A: Western green method

Male -0-5 mm at the end of first hour

Female-0-7 mm at the end of first hour.

B: win Trobe's method

Male- 0-9 mm at the end of first hour.

Female -0-20 mm at the end of first hour.

Clinical Significance: - High ESR value is found is rheumatic fever, rheumatoid arthritis, tuberculosis, allergy, syphilis, cancer, pneumonia and malignant tumors.

f) Coagulation time /Clotting time: -

It is the time required by the blood to clot.

Normal range

Capillary blood method

Slide method – 2 to 6 min

Capillary tube method – 2 to 6 min.

Venous blood method

Howell method 0 to 30 min.

Lee and White method – 5 to 15 min.

Clinical Significance: - Clotting time is more in hemophilia, vitamin k deficiency. Obstructive jaundice, dicoumarol therapy, heparin therapy, pneumonia and leukemia.

g) Blood Sugar: -

Normal range of blood sugar level is 80-120 mg/ 100 ml.

The increase of this level is detected in hyperglycaemia and below this level is found in hypoglycemia.

Clinical significance: - Hyperglycaemia leads to diabetes in which sugar level may rise up to 500 mg/100ml. sometimes it may cross this level also which cause the coma. Hypologycaemia may occur in insulin over dosage, pancreatic tumor adrenal cortical insufficiency and hypopituitarism.

Q.28 Define the following terms. Etiology, Pathogenesis, Manifestation, Lesion, Sign and symptoms, Sequel, Complication of a disease.

Etiology: - It deals with identification of causative agents which provoke a particular disease for example Mycobacterium tuberculosis is the etiological agent for tuberculosis.

Pathogenesis: - Pathogenesis of disease refers to the development or evolution of disease

For Example: - Pathogenesis of tuberculosis indicates how the mycobacterium tuberculae causative organism enters in the body and develops the tuberculosis.

Manifestation: - These are various changes occur during the diseases process.

Lesion: - It is a recognizable structural changes observed during the development of disease.

Sign and symptoms: - Symptoms are the subjective feelings reported by the diseased person to a doctor while sign are recognizable changes.

Sequel: - The outcome of a disease is called sequel. Example - Formation of scar due to inflammation in the sequel of the disease process.

Complication of a disease:- It is a separate process that may develop secondary disease due to some changes produced in the main disease.

Example - Bacterial pneumonia may be a complication of viral infection of the respiratory tract.

Q.29 Describe the etiology, pathophysiology, signs and symptoms of Tuberculosis and Diabetes mellitus, Hypertension. Short note on Epilepsy & Peptic Ulcer.

Answer. Tuberculosis

Tuberculosis is a bacterial infection. It usually occurs in the lungs but may affect any organ or tissue in the body.

Etiology: - Mycobacterium tuberculae is a rod shaped microorganism that requires oxygen tension for optimum growth and produces no toxin. Transmission is usually directed by inhalation of air born organisms or by exposure to contaminated patient secretion.

Pathophysiology: - Tubercle bacilli are inhaled and deposited in peripheral alveoli throughout the lungs. This is the primary tuberculosis. From the lungs, infection spread throughout the body by lymphatic system. The tubercle bacilli is deposited in kidney, growing ends of bone and other areas of high oxygen tension. Cellular immunity involving lymphocytes, macrophages develops and prevent its spread.

Sign and symptoms

Stage I: - The initial infection of primary tuberculosis usually does not provide many signs or symptoms. The incubation period is 4 to 8 weeks, mild fever and malaise may occur as tuberculin hypersensitivity develops.

Stage II: - Pulmonary tuberculosis usually occurs after a period of dormancy in previously infected individual. Fever up to 400 c may occur in late afternoon or evening. Night sweats are common. General malaise, fatigue, irritability and weight loss may occur. A cough particularly early in the morning & production of yellow sputum that may be blood streaked is common. Blood is present due to ulceration of bronchial mucosa. Massive haemorrhage can occur if a pulmonary artery in a tuberculosis cavity ruptures. Death may occur from obstruction of airflow.

Stage III: - Milliary tuberculosis is a massive dissemination of tubercle bacilli throughout the body. Lesion are also found in addition to lungs, in the liver, spleen, bone marrow and other organs which do not have high oxygen tension. The sign & symptoms are nonspecific and include dyspnea, weight loss, weakness, fever, light sweats and gastrointestinal disturbances. Death is certain unless appropriate treatment is introduced.

Treatment

DOTS (Directly Observed Treatment Short course)

Anti-tubercular drugs like Rifampicin, Ethambutol, Isoniazid, Streptomycin etc. are used.

Diabetes Mellitus

It is a non-communicable disease caused by increased glucose level in the blood, known as hyperglycaemia. Normal blood glucose level ranges between 70-90 mg/dl. If the blood glucose level increases beyond normal the person is said to be having diabetes.

Etiology

Diabetes Mellitus is basically divided in to two types.

a. IDDM (Insulin Dependent Diabetes Mellitus)

b. NIDDM (Non-Insulin Dependent Diabetes Mellitus)

The disease results due to either:

a. **Insulin deficiency: -** inability of pancreas to produce enough insulin for the body's need.

b. **Insulin resistance: -** inability of the body cells to use the insulin available.

Signs and Symptoms:

The three classical symptoms of diabetes mellitus are:

- Polyuria (frequent Urination)
- Polyphagia (increased hunger)
- Polydipsia (increased thirst)

Other symptoms are ketoacidosis, nocturia, blurred vision, numbness of feet, itching, drowsiness, slow healing of wounds and skin infection. After long term of the disease retinopathy, lesions of eye and kidney failure occurs.

Pathophysiology:

Due to abnormal metabolism of carbohydrates, proteins and fats – hyperglycaemia and glycosuria results. Osmotic diuresis results in polyuria (loss of water and salts), polydipsia (increase in thirst) and dehydration.

As glucose level rises, the glycoprotein is deposited in the capillaries. Higher glucose is metabolized to sorbitol which is responsible for development of cataracts and neuropathy.

Treatment:

a. Oral hypoglycemic drugs like Metformin, Glibenclimide, and Glipizide etc.

b. Insulin therapy

HYPERTENSION (CARDIOVASCULAR DISEASES)

It is a commonest cardiovascular disease. W.H.O has defined hypertension as "a systolic blood pressure of 160 mm Hg and above and or a diastolic blood pressure of 95 mm Hg and above".

Hypertension is classified as:

a. Primary or Essential hypertension when the exact cause is not known and accounts for 80 to 95% of cases.

b. Secondary hypertension, when it occurs due to identifiable cause such as renal and endocrine diseases or toxemia of pregnancy. About 5 to 20% of cases come under this category.

The various causes for hypertension are – Hereditary and family history, obesity, stress, strain, worry and nervous tension, high salt intake, alcohol and tobacco smoking.

Signs and Symptoms:

Headache, tinnitus (ringing sound in the ear), bleeding from the nose, dizziness, blurred vision followed by blindness and vertigo.

Pathophysiology

Hypertension affects the kidneys leading to renal failure, damages the eyes leading to visual disturbances, haemorrhage, papilledema etc. left ventricular heart failure, cerebral oedema and haemorrhage of the brain follows.

Treatment

Anti-hypertensive drugs like calcium channel blockers (Amlodipine, Nifedipine), ACE Inhibitors (Enalapiril, Ramipril), β-blockers like (Atenolol, Metaprolol) etc. are used.

EPILEPSY

It is a chronic functional disease of the nervous system, characterised by recurrent seiz ures having a sudden onset and spontaneous resolution. Epilepsy due to unknown cause is called primary or idiopathic epilepsy. When epilepsy is due to a known identifiable factor it is called secondary or organic epilepsy.

PEPTIC ULCER

Peptic ulcer disease includes ulceration anywhere in the gastrointestinal tract, where parietal cells secrete hydrochloric acid. Gastric ulcer and duodenal ulcer are the common types of peptic ulcer.

I. Gastric ulcer is the ulcer in the stomach. It is more common in men than women.

II. Duodenal ulcer is the ulcer occurring in the wall of the duodenum. This is more frequent the gastric ulcer.