
UNIT 5 RATIONAL USE OF DRUGS

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5.0 OBJECTIVES

After completing this unit, you should be able to:

- define the drug;
- explain/understand the absorption and effects of drug;
- describe the routes of administration of different drugs;
- understand the rules of administration of drugs;
- list the classification of drugs; and
- list the certain essential drugs used in the community.

5.1 INTRODUCTION

In previous units of this Block 2 you have learnt about first aid in emergency and management of minor ailments. In such emergency situations you may at times have the responsibility to use certain drugs which are essential, inexpensive and not so harmful. In this unit you will be oriented to certain drugs which are rationally used in the community by you as per standing orders. We will discuss about meaning, absorption and effects of drugs, forms and classification of drugs, routes and rules of administration of drugs and essential drugs used in community setting. You need to use these drugs intelligently and rationally.

5.2 MEANING, ABSORPTION AND EFFECTS OF DRUGS

5.2.1 Meaning of Drug

A drug is a substance, which is used to cure, diagnose or prevent diseases. In other words

a drug is a substance which is used for treatment of illness and to restore functions of the body.

5.2.2 Absorption of Drugs

A drug can enter into circulation and reach the site of action only after absorption. The absorption of a drug involves its passage across cell membrane. Drugs can pass through cell membrane through:

- Simple diffusion
- Filtration: involves passage through pores present in the cell membrane.
- Active transport: is a selective process, which requires energy.
- Facilitative diffusion: is similar to active transport but does not require energy.
- Pinocytosis: is similar to phagocytosis where cells engulf fluids of macromolecule from the surroundings.

5.2.3 Effects of Drugs

Usually drugs produce following effects:

- i) Therapeutic effect refers to the ability of the drug to act selectively on an organ, on body tissues or on disease causing organisms and restore normal body functions.
- ii) Side effect refers that a drug may also produce some undesirable effects in additions to therapeutic effects.
- iii) Allergic effect refers that when a drug is administered there is sudden or gradual development of unexpected reactions, which may lead to anaphylactic shock. The action of the drug will depend upon its dose, age and body weight of the client, route and time of administration and also technique of administration.

5.3 CLASSIFICATION OF DRUGS

For the use of community health workers, the classification of selected drugs is as given below.

- **Analgesics** refer to drugs that soothe or relieve pain. For example, Acetyl salicylic acid tablets.
- **Antacids** are drugs which neutralize the acid produced by gastric cells. For example, Aludrox and Gelusil.
- **Antibiotics** refer to drugs that are given by mouth or by injection to remove infection by killing germs responsible for particular infections. For example, Sulphadimidine, co-trimaxazole, dapsone, penicillin etc.
- **Antidiarrhoeal** drugs reduce or check diarrheal diseases. For example, kaolin, pectin suspension.
- **Antiemetic:** These are given to reduce vomiting e.g. siquil or stemetil tablet.
- **Anthelmenthics:** Refer to drugs that kill worms or make them to loose their hold on the intestines so that they can be easily purged out. Example Piperazine citrate, Alcopar, Mebendazole.
- **Antihistamines** refer to drugs that are given orally or parenterally or applied to the skin locally when the person has an allergic reaction for example chlorophenaramine.
- **Antipyretics** refer to drugs that are given to reduce the temperature. For example paracetamol.
- **Antiseptics** which kills germs or check the growth of organism in living cells. Example Boric acid, zinc sulphates, acroflavin, spirit, dettol, savlon for external use only.
- **Expectorants** which are used for assisting in coughing up mucus & phlegm, sputum from the lungs & bronchi e.g. linctus codeine.

Laxative and Purgative: These are the substances that stimulate the bowel movement and soften the fecal matter. A laxative e.g., liquid paraffin, milk of magnesia. Purgative is milder than a laxative is given. when the bowels have not moved for several days and strong evacuating action is needed, e.g., castor oil, epsom salts.

Tonics are drugs, which are taken to strengthen the body and supplement deficiencies of some essential nutrients.

5.4 FORMS OF DRUGS

You must have been using the drugs in various forms in health centre. The usual forms of drugs that are used in the centre are:

- i) Pills, tablets, capsules.
- ii) Ointments, pastes, creams or jellies
- iii) Liquids—mixtures for internal use such as linctus/codeine.
Lotions, suspension, emulsions, calamine lotion are for external use.
- iv) Injections—powder or liquid forms.
- v) Powders for local applications
- vi) Suppositories — used in vagina and rectum

5.5 RULES FOR ADMINISTRATION OF DRUGS

For most of the drugs you will be responsible for dispensing at the health centre. Some of the drugs will be administered according to the prescription and a few of them will be administered by you according to the standing orders.

The dispensing of drugs is a very responsible task. You should maintain the accuracy and observe necessary precautions while administering drugs.

Hence, you should follow certain rules while administering the drugs:

- Before administering the drug you are expected to see the name, strength and method of administration of the drug as mentioned on the label of the container.
- Check for expiry date of drugs. Do not use drugs of expiry date.
- Do not use drug without label on the container.
- Select the right drug and type of preparation for the right patient.
- Make sure what is the correct dose according to age and body weight of the client.
- Administer the right drug to right patient with right dose at right time through right route (follow 5 RS).
- Continue the drug for prescribed schedule and period of time, e.g., two times a day for three days.
- Watch for therapeutic effect and any side effect of the drugs.
- Never substitute one drug for another
- Keep relevant records for the stock of drugs.
- If there is doubt, ask before giving the dose.

Check Your Progress 1

- i) are used to reduce temperature when person is suffering from fever.
- ii) Antihistamines are used to treat disorders.
- iii) Antacid the acid in the stomach.
- iv) reduce vomiting.

5.6 ROUTES OF ADMINISTRATION OF DRUGS

The route of administration is an important factor which influences the absorption of the drugs. The desired effect of drug is achieved by choosing the right frequency and form of drug.

The routes of drug administration are:

- i) Oral route

- ii) Parenteral route
- iii) Local application

i) Oral Route

When a drug is given by mouth, it can be absorbed in the oral mucus membrane, under the tongue, in the stomach or intestine. It is a safe, convenient and economical route but action of the drug is slow. We cannot use this route for unconscious patient. Some drugs can be put under the tongue and allowed to dissolve in the mouth (example nitroglycerine) for rapid onset of the action.

ii) Parenteral Route

It refers to the route other than oral, such as injection, inhalation. The route is useful in emergency, where rapid and quick absorption is required/needed. Here the drugs enter into circulation in an active form. It is useful in case of unconscious patients. But it may produce pain and it needs sterile procedure. The common parenteral route is:

Injections

We may use drugs by injection using the syringe and needle. The injection can be given by any one of the following routes:

- Intradermal – drug is injected in the superficial layers of skin. Example BCG vaccination
- Subcutaneous – the drug is injected beneath the skin. Non irritant substance alone can be injected by this route e.g., measles vaccination.
- Intramuscular – the drug is injected deep into muscle tissue.
- Intravenous – a drug is directly injected into a vein.

Inhalations

Drugs administered through inhalation are gases, volatile liquids, aerosols or vapors. Here the drug will be absorbed immediately. There will be localized effect in diseases such as in case of respiratory tract. But it is difficult method of administering the drug, because, the dose cannot be regulated properly and local irritation of respiratory tract may increase the secretions. This method is used effectively in oxygen administration.

iii) Local Application

Drugs in the form of powder, paste, lotion, gel, ointment can be applied locally for action at the site of application. Instillation of drops and insertion of suppositories are also included in local application. Let us see which drugs are instilled and inserted in the body:

- Instillation – The drug usually in liquid form is put into body cavity or orifice such as nose/ear/eye drops.
- Lotions/solutions – are applied on the mucus membranes in the rectum, vagina, urethra, conjunctiva and nose.
- Insertion – Drugs usually in the form of jelly, tablet or suppository are inserted into a body opening such as vagina or rectum.

Check Your Progress 2

i) What are the purposes of using a drug?

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ii) Which are common routes of administration of drugs?

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5.7 ESSENTIAL DRUGS USED AT SUBCENTRE LEVEL FOR VARIOUS CONDITIONS

There are various types of essential drugs used by the health worker in health centre or community for treatment, cure and prevention of specific ailments. These are to be used in accurate dosage safely and effectively. Let us learn about these essential drugs.

5.7.1 Infections

Following drugs are most commonly used or prescribed when you identify a case of infection.

Sulfadiazine is used in various bacterial and viral infections. It is particularly useful for urinary infections and for diarrhoea associated with fever. It is also used for treatment of various infections such as acute respiratory infections, urinary infections, skin infections and boils etc.

It is available in tablet form as 0.5 gms and is given orally. It is also available as suspension for children 500 mg/ml. It is mostly given for 7-10 days except in urinary infections.

Dosage

6 months-1 year	-	½ tsf initially followed by ¼ tsf 8 hourly
1-5 years	-	1tsf followed by ½ tsf 8 hourly
6-12 years	-	2tsf followed by 1tsf 8 hourly
Adult	-	4 tablets followed by 2 tablets 8 hourly

Cotrimoxazole – Cotrimoxazole is a mixture of two drugs—5 parts of sulfamethoxazole (a sulphonamide) and 1 part of trimethoprim. It cures infections caused by certain types of bacteria. It is not effective in viral infections such as common cold, influenza, chicken pox etc. It is used for patients who are not able to tolerate penicillin.

It is used for treatment of:

- Infection of tonsil – tonsillitis
- Urinary tract infections
- Acute respiratory infection
- Acute dysentery caused by bacteria – patient passes large liquid stools mixed with blood or mucus
- Infection of middle ear – earache and fever.
- Skin infections – abscess etc.
- Fever cases.

Cotrimoxazole is given orally. It is supplied in tablets 480 mg for adult and 120 mg for paediatric tablets. Syrup is also available for children, 240 mg in 5 ml.

Usual dosage

2 month-1 year	-	½ adult tablets or 2 paediatric tablets crushed and mixed with honey or sugar and is given twice daily.
1-5 year	-	1 adult tablet is given twice daily
6-12 years	-	1 to 1½ tablets is given twice daily
13 years and more	-	2 tablets twice daily.

Treatment to be continued for 5 days but for urinary infection it may be continued for 10 days.

Remember

- Do not use drug if patient develops rashes.
- Do not use these drugs for patients of liver disease or in pregnancy.
- Do not use the drug for babies under one month.

Points to be Kept in Mind While Administering Sulfonamides

- Advise the patient to drink plenty of water to avoid kidney damage.
- Observe urinary output.
- Administer correct dose to avoid adverse effect.

5.7.2 Pain and Fever

You must have used most of the drugs to relieve pain and reduce fever. As you know there are many "Pain Killer" drugs. Most of them are harmful but some of them are more harmful like Acetylsalicylic acid (aspirin), acetylsalicylic acid with calcium carbonate (calisprin or disprin), acetaminophen (Paracetamol), Ibuprofen (Brufen), Ergatamine with caffeine etc. You must take extra care so that drugs are given in correct dose to avoid adverse effects.

- i) **Aspirin:** Aspirin usually comes in the form of 300 gms tablets. It is very useful, low cost, analgesic and helps to reduce pain, reduce fever and reduce symptoms of common cold and influenza.

Dosage: Adult dose is 1 or 2 tablets (300 mg to 600 mg) thrice a day. For children 1 tablet is given thrice a day.

While administering Aspirin you should keep following points in mind.

- It should not be used for stomach pain and heartburn.
- It is better not to give aspirin to children below 12 years and to asthma cases.
- Never give aspirin to children under one year of age and pregnant women.

- ii) **Paracetamol:** It usually comes in 500 mg tablets or also syrup. It is safer for children. It does not cause stomach erosion it can be used for pregnant women. Paracetamol can be used (orally) in the case of fever, common cold, sore throat etc. It can be used by mouth 4 times a day.

Dosage

- For babies below 6 month: 1/8 of tablet or 1/2 teaspoonful syrup 4 times a day
- For children 3 to 7 years: 1/2 tablets 4 times a day.
- For children 8 to 12 years: 1 tablet 4 times a day
- For 12 years and above: 1 to 2 tablets 4 times a day

5.7.3 Acidity and Indigestion

The common drug used for acidity, heart burn, stomach ulcer is Aluminium hydroxide, Magnesium hydroxide or Trisilicate i.e. Alludrox or Gelusil tablets.

Usually the Alludrox or Magnesium hydroxide comes in tablets of 500-750 mg or in syrup of 300- 500 mg in 5 ml. These antacids can be used occasionally for regular treatment. It is very effective if it is taken after an hour of meals or at bedtime. These tablets can be chewed. For severe stomach ulcer, it may be necessary to take 3-6 tablets or 3-6 teaspoons of syrup every hour. This liquid antacid provides immediate relief.

5.7.4 Cough

Linctus codein is a strong painkiller and also one of the most powerful cough reducing agent. It often comes in the form of syrup. It should be given according to age and body weight, One can follow the instructions as given on the label of the bottle.

5.7.5 Allergic Reactions

The commonly used drug for allergic reaction is chlorpheniramine maleate i.e. Avil. It comes in the form of tablet, syrup and injection.

Chlorpheniramine maleate is useful in treatment of allergy. Some persons may develop reactions to allergens, which may be due to certain foods, house hold dust, perfumes, toiletry articles, chemicals, plastics and synthetic fibres, drugs and plants or flowers.

Allergic reactions even start after eating, inhaling or touching such agents. It starts with itching and a skin rash in the form of tiny raised red areas, running nose, eyes may become red and patient may experience breathless and wheezing. An allergic attack can even result in low blood pressure and shock.

Chlorpheniramine maleate can be used to treat allergic reactions. It does not correct the cause of allergy. Hence, the cause should be identified by finding out what person ate, drank or touched before allergic reaction occurred. It can also be used for treating drug reactions and allergic reactions and due to insect bite.

Dosage: It is given orally. It is supplied in tablet form containing 40 mg. Syrup containing 2 mg per 5 ml (1 tsf).

Age in Years	Dose
Upto 1 year	1 mg (1/2tsf) twice a day
1-5 years	1 mg (1/2tsf) thrice a day
6-12 years	2 mg (1/2tablet) twice a day
13 and above	4 mg (1 tablet) twice a day

Side effects of this drug can be drowsiness and dryness of mouth, blurring of vision.

Chlorpheniramine maleate is a less expensive antihistamine and causes sleepiness. The other antihistamine like, promethazine (phenergan), Liphendryl (Benadryl) causes more sleepiness.

Precautions to be taken while administering the drug:

- All patients who have allergic reactions associated with a fall in blood pressure should be referred.
- Patient should be informed that his ability to drive or operate a machine is temporarily affected.
- Patient should be advised not to drink alcohol during treatment with antihistamine.
- Toxicity to chlorpheniramine can also cause convulsions which needs treatment with diazepam.

5.7.6 Worm Infestation

One most common drug used in worm infestation is mebendazole:

- i) **Mebendazole** usually comes in the form of 100 mg tablets. It is effective for all types of deworming i.e. hookworm, roundworm, pinworms etc. When there is severe worm infestation it may cause some pain in gut or diarrhoea. It does not cause vomiting. It should not be given to pregnant women and children below 2 years of age.

Dosage

Mebendazole is given as one tablet twice a day for 3 consecutive days. The dosage is same for both adults and children. But in case of pinworm only one tablet is given once a week or for 3 weeks.

- ii) **Metronidazole** is a anti helmenthic drug which is commonly used in case of Amoebiasis and giardiasis. We can say that it kills internal parasites such as amoeba and giardia. It also kills other parasites like trichomonas which cause infection in vagina.

It is available in 200 mg and 400 mg tablet. It is also available as suspension (100 mg in 5 ml).

Let us see what is the dosage in various age groups.

Adults

2 tablets of 400mg thrice daily for 5 days

Children	1-2 years	100 mg (1tsf)	three times daily for 5 days
	2-3 years	200 mg (2tsf)	
	4-7 years	300 mg (3tsf)	
	8-12 years	400 mg one tablet	

It has bitter taste that causes nausea and rarely vomiting. It may also cause headache.

Precautions

- Do not give empty stomach
 - Advise the patient to avoid alcohol while taking drug
 - Inform patient it may cause bad taste in mouth
- iii) **Piperazine citrate** usually comes in 500 mg tablets and also comes in the form of syrup (500 mg in 5 ml). It is choice of drug to treat roundworm and pinworm.

Dosage

Roundworm (two doses)	Pinworm (one dose)
● Adults 8 tablets (4G)	5 tablets
● Children 8-12 years 6 tablets	1, ½ tablets
● Children 3-8 years 4 tablets	1 tablet
● Babies under 1 year ½ tablet	½ tablet

Piperazine should not be given to the persons with epilepsy or fit.

iv) **Bephenium Hydroxynaphtholate** granules (Alcopar) is given in hookworm infestation

Dosage

A single dose of 5 gms by mouth is given empty stomach. Food is to be withheld for 1 hour afterwards.

It is usually necessary to administer anthelmintic drug to other family members also as infestation (especially pin worms) is likely to affect the members of family.

Patient with worm infestation invariably also suffer from anaemia. Therefore, supportive treatment should also be administered after required clinical test and referral.

5.7.7 Other Drugs

In addition to the above drugs you are expected and authorized to use following drugs for internal use:

- Antimalarial drug, example Chloroquine.
- Anti tuberculosis drugs such as INH, Refampicin.
- Anti leprosy drugs such as dapsone.
- Vitamin and mineral products; Vitamin A, Multi vitamin, Iron capsules.

In addition for internal use you are expected to use different types of ointments and drops which can be applied to skin, eye, ears and throat.

Check Your Progress 3

- i) List the drugs commonly used for fever.
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- ii) Name the most common drug used as antihelmintic.
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- iii) State the dosage of the commonly used antihelmintic drug?
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5.8 LET US SUM UP

In this unit we have discussed drugs used by health worker for commonly occurring problems in the community. This has given you guidelines for treating certain conditions and identifying conditions that need referral. Using drugs carefully and rationally will help you to treat the community safely during illness. Some of the commonly used drugs have been discussed. Similarly more drugs can be used with standing orders in community depending on health problems. You should use these drugs with care.

5.9 MODEL ANSWERS

Check Your Progress 1

- i) Antipyretics
- ii) Allergic
- iii) Neutralize
- iv) Antiemetics

Check Your Progress 2

- i) ● Therapeutic uses, diagnose or Preuent diseases
 - Supplemented as nutrients
 - Contraceptive pills for preventing pregnancy
- ii) ● Oral
 - Parenteral
 - Inhalation
 - Local applications

Check Your Progress 3

- i) ● Aspirin
 - Paracetamol.
 - Brufen
- ii) Mebendazole
- iii) One tablet twice a day for three consecutive days.

NOTES