left side by the septum, so that blood cannot cross the septum from one side to the other. Each side is further divided by an atrioventricular valve into an upper chamber, the atrium and a lower chamber, the ventricle. Hence the human heart has four chambers viz. right atrium, right ventricle, left atrium and left ventricle.

The size and shape of our heart is like our own fist.

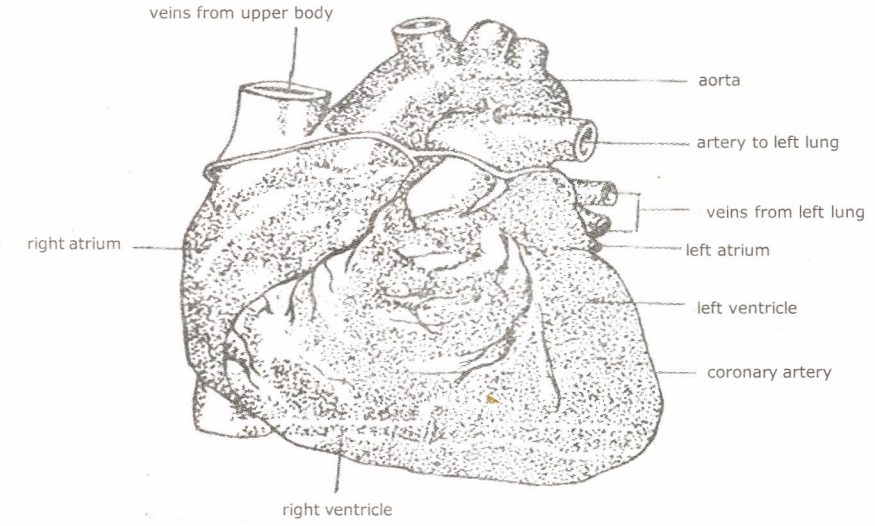


Fig. 1.4 (A) Heart with major blood vessels.

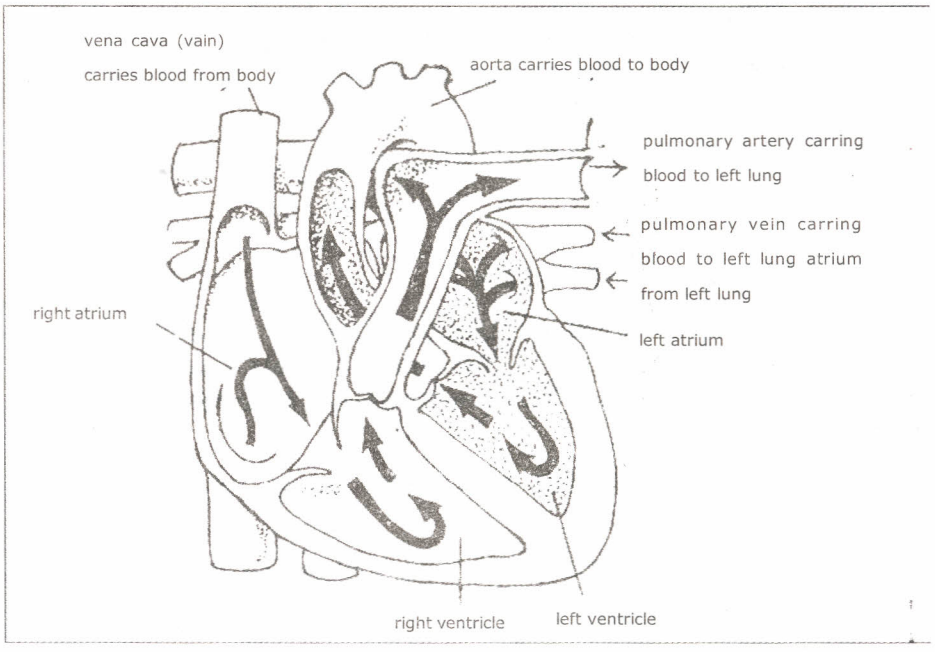


Fig.1.4(B) Internal view of heart arrows show direction of flow of blood.

The main function of the heart is to maintain a constant circulation of blood throughout the body.

The blood passes from the right side of the heart to the left side via the lungs. The right side of the heart deals with deoxygenated or impure blood.

The left side of the heart deals with oxygenated or pure blood.

Both atria contract at the same time, followed by the simultaneous contraction of both ventricles.

Note: Your left hand side shows the right side of the heart and the right hand shows the left side of the heart.

The number of heart beats per minute ranges from 70 to 80 (average 72 times).

INTEXT QUESTIONS 1.4

State True or False:

1. Diaphragm is a respiratory muscle. ( )
2. Pharynx is also known as 'voice box'. ( )
3. In a minute we respire for about 72 times. ( )
4. The interchange of gases takes place in heart. ( )
5. Arteries carry blood away from the heart. ( )

Please tick the correct answer:

1. After digestion proteins are converted into:
   a) Fatty acids ( )
   b) Amino acids ( )
   c) Starch ( )
   d) Remain unchanged ( )
2. Stomach secretes:
   a) Bile ( )
   b) Saliva ( )
   c) Enzymes ( )
   d) Gastric juice ( )
3. Total number of chambers present in human heart is:
   a) 1 ( )
   b) 2 ( )

c) 3 ( )

d) 4 ( )

4. Arteries and veins are:

a) Muscles ( )

b) Glands ( )

c) Blood vessels ( )

d) Chamber ( )

(F) THE EXCRETORY SYSTEM (OR THE URINARY SYSTEM)

All plants and animals produce harmful substances due to a number of metabolic activities occurring in their body. The waste material formed by the body must be removed.

Hence, the process of excretion can be defined as the elimination of wastes from the body which otherwise are toxic if retained within the system. The kidney, large intestine, skin, lungs and the liver do the work of removing the waste material out of the body.

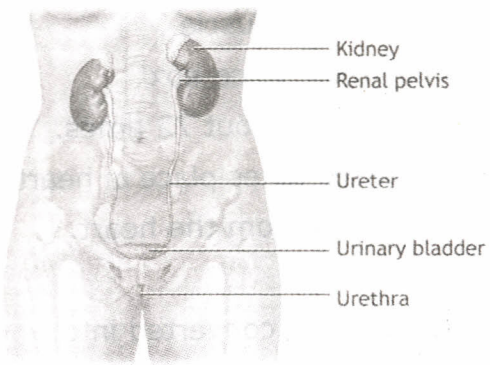


Fig.1.5.(A) Urinary system

The urinary system is one of the excretory systems of the human body. It consists of the following parts:

Two kidneys – Which helps in the formation of urine.

Kidneys are bean-shaped organs, present on the posterior abdominal wall, one on each side of the vertebral column. Each kidney is made up of numerous (about 1 million) functional units, the nephrons.

Two ureters – These are 2 tubes which convey the urine from the kidneys to the urinary bladder.

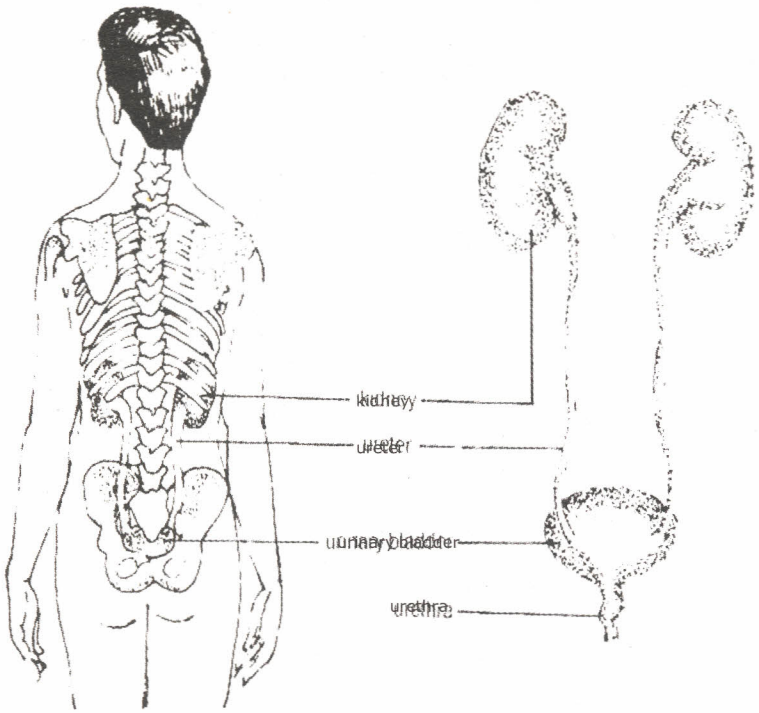


Fig.1.5. (B) Urinary system

One urinary bladder – it is an elastic distensible bag where urine collects and is temporarily stored.

One urethra – it is an opening through which urine is discharged from the urinary bladder to the exterior.

Functions of the excretory system

Functions of the excretory system are as follows:

1. It excretes waste products from the body for example, ammonia, urea and uric acid.
2. It helps in the maintenance of fluid and electrolyte balance.
3. It helps to maintain the normal pH of blood and other fluids.
4. It also helps to maintain the optimum concentration of certain constituents of blood like calcium.
5. It maintains the osmotic pressure in blood and tissues.

(G) THE ENDOCRINE SYSTEM

The endocrine system consists of various glands that are widely separated from each other. These glands are commonly known as the 'ductless glands' because the hormones they secrete pass directly from the cells into the blood. The ductless glands secrete many hormones which play a vital role in the normal functioning of the body.

A hormone is a chemical substance which, having been formed in one gland or, is carried in the blood to another organ or the target organ where organ influences activity.

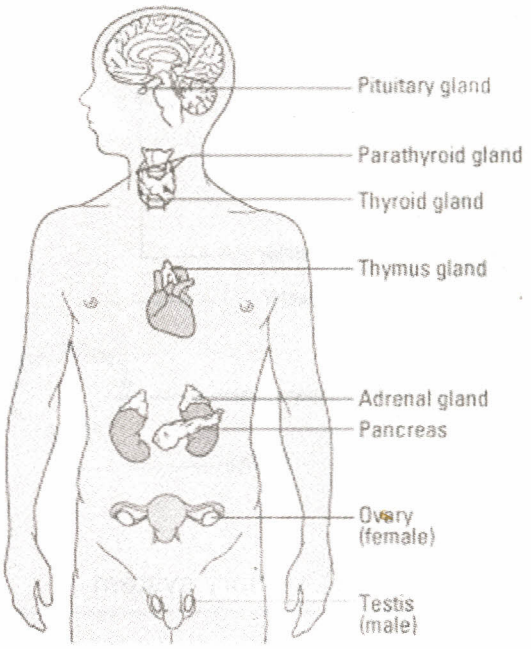


Fig. 1.6 Position of endocrine glands in the body

Our body cannot work and grow normally without hormones. Glands which release chemicals directly into blood stream.

The endocrine system consists of the following glands:

Pituitary gland – This gland is located on the ventral side of the brain.

It is known as the master gland of the body because it secretes maximum number of hormones and also it controls the secretion of hormones secreted by other glands.

Thyroid gland – It is found in the neck region, at the base of larynx.

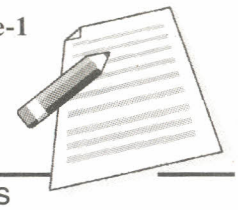
It secretes thyroxin which helps in normal development of the body.

Parathyroid glands – They are 4 small oval shaped bodies, two on each side of thyroid glands.

Adrenal glands – One situated on the top of each kidney.

Pancreas (Islets of Langerhans)-

It secretes 'insulin' hormone that helps in maintaining normal blood sugar level.



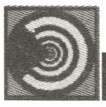
Pineal gland – This gland is situated in the brain near pituitary.

2 Ovaries in female

They secrete two important female sex hormones - estrogen and progesterone.

2 Testes in male

They secrete male sex hormone - Testosterone.



INTEXT QUESTIONS 1.5

Q.1 What do you mean by excretion?

Q.2 What is hormone?

(H) THE NERVOUS SYSTEM

The system that receives the stimulus, transmits it to other parts of the body and the corresponding effects shown is known as the nervous system.

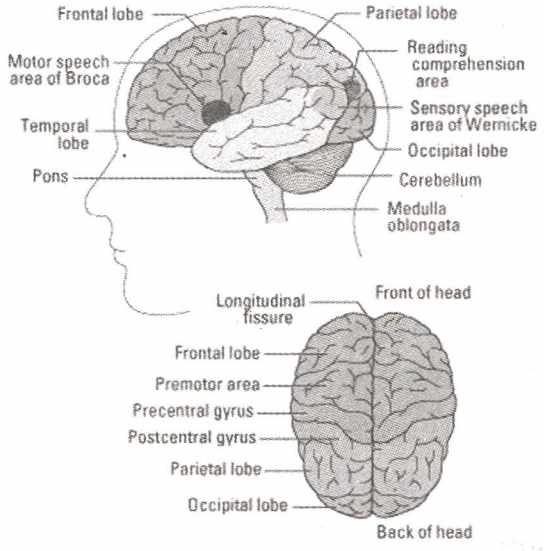


Fig.1.7.(A) Diagram of Nervous system showing brain

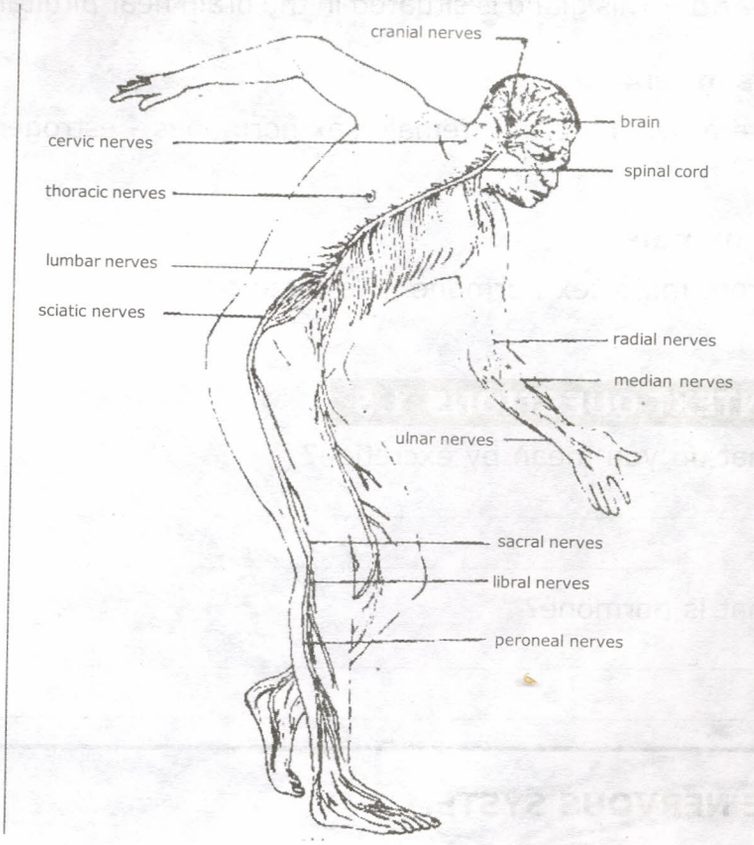


Fig.1.7.(B) Brain and spinal cord

The nervous system consists of a large number of units called **'neurons'**. Neurons are simply referred as nerves.

Nervous system is concerned with the following main functions:

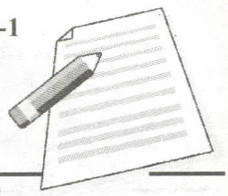
1. It controls and regulates various activities of the organs and the organism as a whole. For example, muscular contraction, rate of respiration, heartbeat, sense of vision, hearing, pain etc.
2. It coordinates the working of various glands and tissues of the body; thus regulating the internal environment of the body.
3. It helps the organism to react to the external environmental fluctuations.

Nervous system mainly consists of three parts:

1. CENTRAL NERVOUS SYSTEM (CNS)
2. PHERIPHERAL NERVOUS SYSTEM (PNS)
3. AUTONOMIC NERVOUS SYSTEM (ANS)

Central Nervous System

It consists of the brain and the spinal cord. Entire CNS is protected and surrounded by membranes called 'meninges'. These cavities or



the space between the membranes and the brain or spinal cord are filled with a clear fluid called 'cerebrospinal fluid' or 'CSF'.

Peripheral Nervous System

It consists of the nerves that arise from brain and spinal cord. Nerves are solid, white and thread like structure. There are mainly there types of nerves: sensory, motor and mixed nerves.

The peripheral nervous system consists of-

31 pairs of spinal nerves (arising from the spinal cord)

12 pairs of cranial nerves (arising from the brain)

Autonomic Nervous System

The ANS controls the functions of the body carried out automatically, which are initiated in the brain. For example, maintenance of blood pressure, secretion of glands.

(I) THE REPRODUCTIVE SYSTEM

The ability to reproduce is one of the properties that distinguish living beings from non-living matter. The reproductive system is a system of organs within an organism which work together for the purpose of reproduction. Human reproduction is a sexual reproduction that takes place as internal fertilization.

In human beings the reproductive organs of the male and the female differ anatomically and physiologically. Both males and fe-

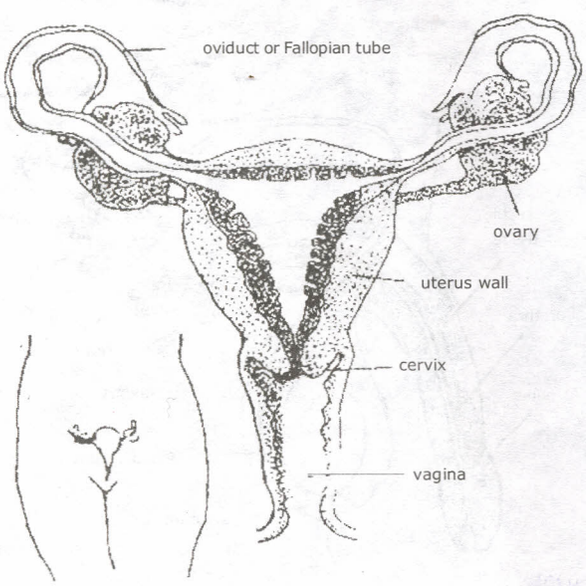


Fig.1.8 Female reproductive system as seen in a median sagittal section

males produce specialized reproductive cells known as gametes, containing genetic material-genes and chromosomes.

Female reproductive system

The human female reproductive system consists of a series of organs primarily located inside the body and around the pelvic region of a female that contribute towards the reproductive process.

The internal organs of the female reproductive system lie in the pelvic cavity and consist of:

Vagina, which acts as the receptacle for the male's sperm

Uterus, which holds the developing foetus

Two fallopian or uterine tubes which extend from the sides of the uter.. and

Two ovaries (female sex glands) which produce the female's ova.

Breasts are located in the chest region. They play an important role in reproductive functioning such as breast feeding.

Important sexual hormones of females include ' estrogen' and 'progesterone'.

Male reproductive system

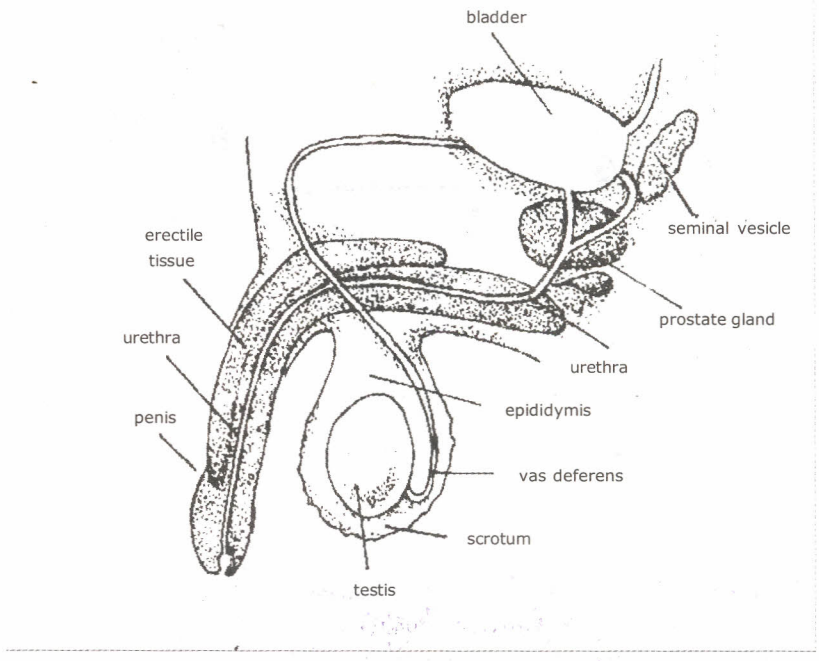


Fig.1.9 Male reproductive system

The primary direct function of the male reproductive system is to produce spermatozoa for fertilization of the ovum.

The major reproductive organs of the male are:

Penis- It is the male sex organ for sexual intercourse.

Scrotum- It contains the testes.

Testes- Production of sperm and sexual hormone takes place in testes.

Epididymis- Development and storage of sperms takes place in epididymis.

Prostrate- Nourishment of sperm takes place with the help of prostate fluid.

Urethra - It is the tube that carries urine from the bladder to outside the body. In addition it ejects semen.

An important sexual hormone of males is 'testosterone'.

INTEXT QUESTIONS 1.6

1. Fill in the blanks:
   1. The functional unit of nervous system is _____.
   2. CNS consists of _____ and _____.
   3. PNS consists of _____ spinal nerves and _____ cranial nerves
   4. Our body contains _____ chromosomes.
   5. _____ is a male sex hormone.

1.6 WHAT YOU HAVE LEARNT

In this lesson, you have gained the knowledge of the structure and function of human body, the contribution of each system and a general description of interrelationships between all body systems. You can now understand how our body performs its functions. The sum of these activities enables the human being to live in and utilize his environment in a useful way.

1.7 TERMINAL QUESTIONS

1. Describe the process of digestion.
2. With the help of a diagram explain the flow of blood through the heart.

Notes

2

HEALTH AND HYGIENE

2.1 INTRODUCTION

Health education plays an important role in the community hygiene. To prevent illness and have positive health attitude, correct and complete knowledge of health is necessary. Health is cleanliness and cleanliness is one of the main defenses against diseases, whether contagious or self-generated. In this lesson we will discuss the actual meaning of health and hygiene, so that the aim of good health can be achieved through sanitary habits and healthy way of living.

2.2 OBJECTIVES

After reading this lesson you will be able to:

- Know the meaning of health.
- Understand the importance of physical, mental and spiritual health.
- Know the meaning and importance of hygiene.
- State the necessity of personal, environmental and food hygiene.

2.3 WHAT IS HEALTH?

Health is a positive state of well being, where every part of the body and mind is in harmony and in proper functioning balance with every other part. In other words, when every organ of the body is functioning normally, the state of physical well being is known as health. It has been well said that only that person can be called really healthy who has a sound mind in a sound body. Health is the characteristic of life that enables a person to live longer.

According to World Health Organisation (WHO):

"Health is the state of complete physical, mental, spiritual and social well-being and not merely absence of disease".

If a person is disease free or in a good physical state, but under stress, tension, anger, greed etc. than that person is not considered as a healthy person. Hence, in addition to physical health, we must consider the mental and emotional health also, only than spiritual and social health can be achieved and man can progress forward for the well being of the society.

Let us understand the various aspects of health-

- **Physical health** – When the body is free from any physical ailment or abnormal condition, it is physical health.
- **Mental health** – The state of absence of stress, tension, worry, negative thoughts etc. is mental health.
- **Emotional health** – A balanced state of absence of anger, greed, proud, hatred etc. is emotional health.
- **Spiritual health** – To live in yourself with uniformity and harmony is spiritual health. Also, to have faith in your religion and respect & view other's religion with equal harmony is known as spiritual health.

Community health is the art and science of maintaining, protecting and improving the health of people through organized community efforts.

Fig. 2.1 clean the enviornment

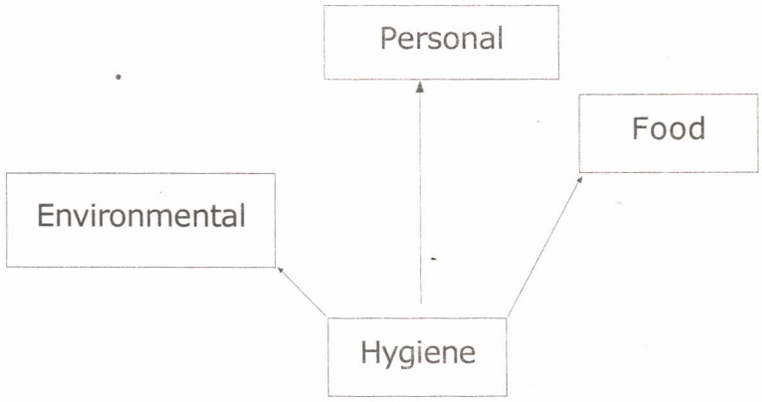
INTEXT QUESTIONS 2.1

Q.1 Define 'Health' according to WHO.

Q.2 What do you mean by 'mental health'?

2.4 HYGIENE

Hygiene is defined as the science and art of preserving and improving health. The purpose of hygiene is to allow man to live in healthy relationship with his environment. It deals both with an individual and a community as a whole. In order to be healthy one must realize that hygiene and sanitation play a very important role.



Various aspects of hygiene

2.5 PERSONAL HYGIENE

Personal hygiene means cleanliness of our body.

It usually relates to consideration of individual health. Personal aspects of hygiene involve consideration of internal and external cleanliness, proper sleep, food, water, exercise, work and care of some vulnerable parts of the body. It also depends upon environmental factors like proper ventilation, adequate lighting and on

personal factors like daily bath, clean absorbent underwear and foot wear, also on social factors like working condition, family life and good social friends.

Personal hygiene involves everything with which we come in contact like:-

(a) Personal cleanliness habits:

- Personal habit of getting up early in the morning.
- Washing hands before meals.
- Use of soap for removal of infection.
- Regular going to toilet everyday.

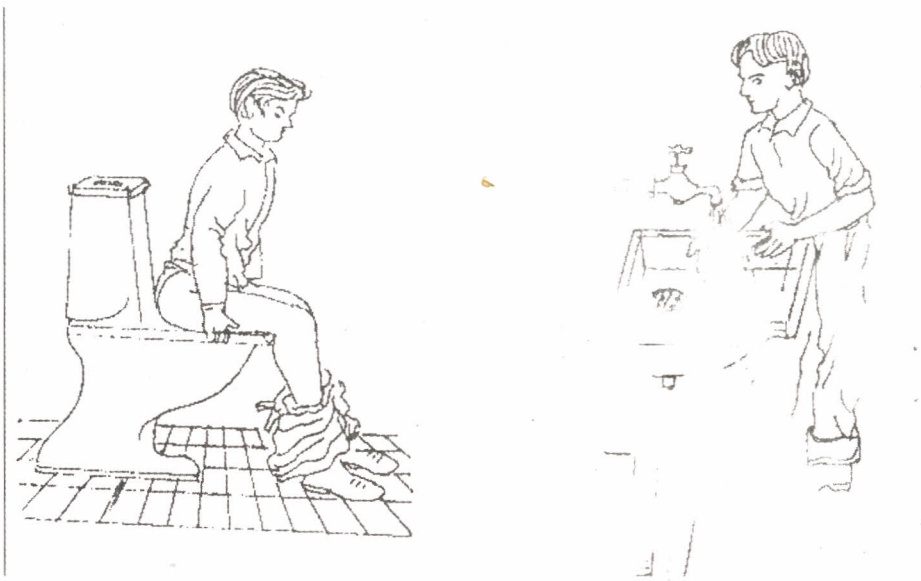


Fig.2.2 Personal Hygiene

All these helps to keep the body clean.

(b) Proper nutrition, well-balanced diet simple to digest and free from dust and parasites, taking more of raw vegetables and fruits keep the internal system healthy.

(c) There should be balance between rest and activity.

(d) Regular exercise will keep the weight down, will give good digestion and keep the mind active and cheerful. Exercise and physical activity is a well deserved preventive method to keep the body and mind healthy.

(e) Many people think themselves in good health regardless of the fact that the bowels may be irregular. They suffer from foul breath; they have coated tongues and many other indications of auto-intoxication. Constipation is very rightly called 'the mother of nearly all diseases' and therefore, should be avoided, but not by

strong medicines but by regulating the diet (that is rich in roughage), by proper exercise, in short by observing the laws of health.

In short,

A clean body is a healthy body

General care of important body parts

Lack of personal hygiene gives rise to various diseases because disease causing microbes grow in dirty and unhygienic atmosphere. So to keep the body healthy, cleanliness of following body parts should be given extra care:

1. Eyes

Eyes are one of the wonderful gifts from nature, but if we pay less attention to its care, then consequences in the form of blindness or wearing spectacles can occur. Hence we must remember the following points:-

- Wash eyes with normal cold water 3-4 times daily.
- Do not use your or other's dirty hanky or any other dirty cloth and dirty hands for wiping your eyes.
- Do not use spectacle (glasses), or hanky which has been used by other person.
- While reading or writing, light should come from the left side and there should be a distance of at least 32cm between your eyes and the book.
- Do not read while lying down on the bed.
- Avoid using *kajal* or similar cosmetics for eyes.

Do you know...

Eyelashes and eyebrows keep dirt and dust out of the eyes.

2. Ears

For proper hearing, care and cleanliness of ears is important. For this:

- Keep your ear dry and clean.
- Whenever necessary clean your ears with a dry and clean ear-bud.
- Do not put ear-bud deep into the ears.
- Never put any sharp and pointed objects like pen, pencil, match-

stick or tooth-pick into your ear because they might damage the ear-drum.

- Protect your ears from loud noise.
- Cover your ear properly in case of severe cold.
- Do not put oil or other liquids inside the ear as they may cause fungal infection.

3. Teeth

Teeth help in mastication (chewing) and proper pronunciation of words. If proper cleansing is not done, then some food particles may get stucked in between the teeth and get fermented and that results in pyria, bad odour, toothache etc. Hence, for healthy teeth following points must be remembered:

- Brush your teeth properly in the morning and at night before going to bed. After brushing, clean your tongue gently with a tongue cleaner.

Fig. 2.3 Brushing teeth twice a day

- Rinse your mouth with water after every meal.
- Do not eat hot and cold products at the same time.
- Use maximum of citrus fruits like orange, lemon etc. which contains vit.c, calcium and phosphorus, which are helpful for healthy teeth.

4. Skin

Cleanliness of skin is very important because sweat and other toxins are excreted out from the body through skin. If proper care is not taken, then dust particles, microbes etc. are deposited on the skin in the form of a layer thus covering the pores of skin, as a result rash, pimples and foul odour appears in the skin. Therefore, following points must be remembered:

- Take bath daily with clean water.

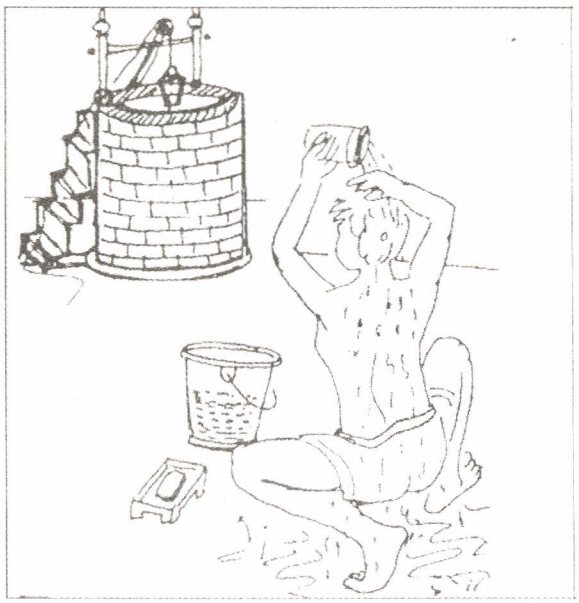


Fig. 2.4 Bathing with clean water

- Use maximum of cotton clothing. The clothing should be loose and neat & clean.
- Take more of nutritious, alkaline diet (about 60–70%) such as, seasonal green vegetables, fresh seasonal fruits, raw salad etc.
- For healthy skin, avoid oily and spicy food like *kachori, samosa* etc.
- To keep your skin healthy, drink plenty of water in a day.

5. Nails

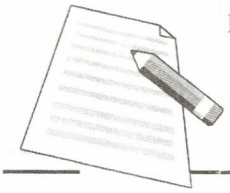
Abnormal growth of nails causes deposition of dust and germs inside the nails and that is a big danger to the health. Hence for proper cleansing of the nails, following points must be remembered:

- Keep your nails clean and trimmed.
- Do cut your nails with a nail-cutter once in a week.
- Do not cut the nails with teeth.

6. Hair

If proper hygiene is not maintained for hair then consequences in the form of dandruff, lice and other diseases can occur. So to avoid all this following things are helpful:

- Wash hair regularly and use shampoo or soap at least twice in a week.
- Comb your hair properly so that all the dust comes out and the hair will not get tangled.
- Put oil in the hair at regular intervals.



Important note:

Toothbrush, comb, towel, soap, nail cutter and handkerchief help us to keep ourselves clean. Keep these things clean and in their proper place.

INTEXT QUESTIONS 2.2

State True or False:

1. Reading while lying down on the bed is good for eyes. ( )
2. Putting oil or liquids inside the ear is a good habit. ( )
3. Brushing teeth twice daily is good. ( )
4. Long nails are good for health. ( )
5. Oily and spicy food is good for skin. ( )

2.6 ENVIRONMENT HYGIENE

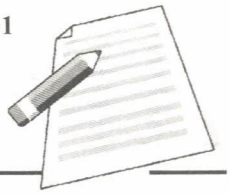
Health education of the masses helps to develop an interest in the environmental sanitation. Though we try to keep ourselves personally very clean, we do not usually care for our surroundings. Our sources of water are constantly getting polluted. Unhygienic surrounding invites mosquitoes and flies.

Environmental hygiene or sanitation thus helps to reduce the incidences of those diseases which are commonly acquired or transmitted through excreta or contaminated water, food and drinks. These include gastrointestinal diseases like diarrhoea, dysentery, cholera etc. and insect-borne infections like malaria, dengue, plague, filariasis, etc.

Because of its universal use, water can be the channel for spreading various diseases like typhoid, cholera, dysentery etc. Besides these, viral hepatitis, polio and worm infestation are also transmitted because of the use of contaminated water. Drinking water supplies may be liable to get contaminated with sewage or other excreted matter.

Water pollution can be effectively controlled by:

- Educating the people regarding use of safe drinking water.
- Wherever possible, the drinking water should be provided through the piped water supply.
- Sanitary wells should be provided where the piped water supply is not possible.
- Conventional water purification ways like disinfection by bleaching powder or chlorine gas should be regularly employed.



- Domestic filters should be used where chemical disinfection of water is not feasible.

Unsafe disposal of faeces (stool) is one of the major causes of spread of diseases, especially in rural areas. Many illnesses are caused by the germs and worms (or their eggs) which are found in the stools or faeces of the infected persons. These germs get into the water, into food, utensils and to the surfaces used for preparing food and are transmitted to new hosts either by the dirty fingers or by contaminated food or water. Hence, personal as well as public cleanliness or sanitation is important in order to prevent this faecal to mouth transmission of infections.

To prevent this and to maintain proper environmental hygiene, one must remember and follow the underline points:

- Public toilets (latrines) should be built and used.
- If that is not possible, people should defecate (pass stool) at designated places away from habitation (houses).
- After defecating, the faeces should be buried right at that place.
- The faeces of babies and children have as many dangerous germs as the faeces of adults, so their faeces should be cleared up immediately.
- Latrines should be cleaned regularly and kept covered.
- The faeces of animals should also be kept away from houses and water sources.
- The dung or 'gobar' of cattle should be either used in the gas plant or in a manure pit or made into cakes (*uple*) for fuel at a secluded place.

› wash hands with soap after defecating and
ɛ bottom of a baby, who has just defecated.

ap is not available, instead of using mud the
for cleaning the hands is 'ashes' of burnt wood

r hands into their mouths quite often, so it is
ısh a child's hands often, especially before

ɔuld be washed every time he makes it dirty.
ɛp flies away from the face and prevent eye
ı.

NE

ssential part of maintaining good health. If the
e are ignored or overlooked while buying, preparing, cooking and storing food; the consequences in terms of 'food poisoning' can be sudden and severe.

So, one should adopt following measures to maintain good food hygiene:

(a) A clean kitchen:

In order to multiply, bacteria need food, warmth, moisture and time. So, we must keep our kitchen clean and dry.

- Keep food covered.
- Do not leave scraps lying around and wipe away any spillages (left over food).
- Empty rubbish bins (dust bins) frequently.

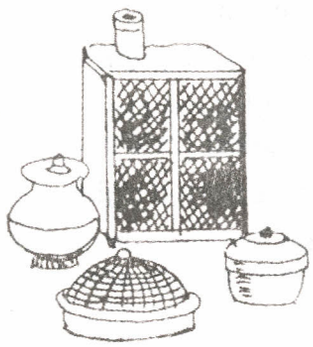


Fig. 2.5 Keep food covered

Fig. 2.6 Use dustbin

- Keep pets away from food and from the kitchen.
- All these measures will help to prevent insects such as flies, cockroaches' etc. spreading diseases.

(b) Cleanliness during preparation of food:

Always wash your hands with soap before touching food.

- If you need to cough, blow your nose or sneeze use a clean cloth or handkerchief, so as not to spread germs and wash your hands before touching the food again.
- Vegetables need to be washed properly and carefully as soil may contain bacteria.
- Wash knife thoroughly before and after cutting raw food items, meat etc.

(c) Cleaning of refrigerator:

- Do clean the refrigerator (fridge) regularly.
- Take out all food items and wash all surfaces including the shelves with hot soapy water.