

## Chapter 13

# Our Health



### 13.1 Meaning of Health

Did it ever happen to you that in spite of yearning to do something of your choice you did not managed to do it because you were not feeling well? Like- participating in a cricket match, going to watch a movie, going to a fair or participating in any programme of your school.

We often use the term health knowing or unknowingly in our expressions like -'My health is not well today' or 'my mind is not healthy enough for any work.'

Let us try to understand, what health is.

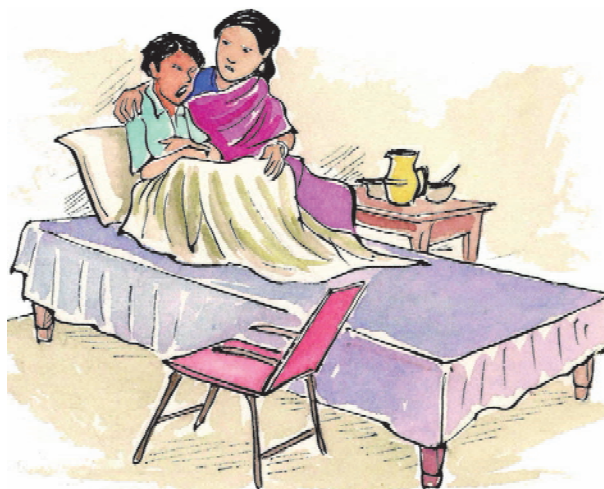


Fig. 1

- Discuss with your friends and make a list of all such situations when you do not feel healthy.

Generally we say that feeling healthy is feeling good. Being healthy for us is being able to do our daily work properly. Thus health is such a state of well-being mentally and physically that enables us to perform our duties skillfully, ably and efficiently.

### 13.2 Health and disease

Staying healthy would have different implications for different people. 'Good health' for a dancer may mean being able to dance properly with graceful postures. On the other hand, good health for a person who plays the flute may mean having enough breathing capacity in his/her lungs to control the notes from his/her flute. A player who can perform efficiently even in adverse conditions is healthy.

We can be unhealthy often without there being a simple cause in the form of an identifiable disease. We would say that the persons involved in the above mentioned work are unhealthy if they failed to perform them properly.

If this is what we mean by 'health', what do we mean by 'disease'? The word is actually self-explanatory - we can think of it as 'disease' or disturbed ease. Disease, in other words, literally means being uncomfortable. However, the word is used in a more limited meaning. We talk of disease when we can find a specific and particular cause for discomfort. This does not mean that we have to know the absolute final cause; we can say that someone is suffering from diarrhoea without knowing exactly what has caused the loose motions.

- Differentiate between being healthy and unhealthy.

### **13.3 Factors that affect health**

Our health depends upon our home, neighborhood, organisms and condition of the environment around us.

- Does every house in your locality have a supply of clean drinking?
- Where is the waste generated from your house thrown?
- How is the waste generated in your colony managed?
- How often are the roads and drains of your colony cleaned?

We all need to consciously try to keep our surroundings clean. Consider what would happen if no agency is ensuring that waste is collected and disposed. What would happen if no one takes responsibility for clearing the drains and ensuring that water does not collect in the streets or open spaces? So, if there is a great deal of waste thrown in streets, or if there is open drainwater lying stagnant around where we live, the possibility of poor health increases. These situations increase the incidence of being unhealthy.

Thus harmful organisms like certain bacteria, viruses, fungi, helminthes and nematodes may be the cause of our ill health. Natural calamities like flood, earthquake and famine may also affect our health.

### **13.4 Expression of diseases on the basis of symptoms**

Let us now think a little more about diseases. In the first place, how do we know that there is a disease? In other words, how do we know that there is something wrong with the body? There are many tissues in the body, as we have studied in the Chapter- 'Multicellular Structure: Tissue'. These tissues make up physiological systems or organ systems that carry out body functions. Each of the organ systems has specific organs as its parts, and it has particular functions. So, the digestive system has the stomach and intestines, and it helps to digest food taken in from outside the body. The musculoskeletal system, which is made up of bones and muscles, holds the body parts together and helps the body move.

When there is a disease, either the functioning or the appearance of one or more systems of the body will change for the worse. These changes give rise to 'symptoms' and signs of disease. Symptoms of disease are the things we feel as being 'wrong'. So, having a headache, cough, loose motions, a wound with pus; are all symptoms. These indicate that there may be a disease, but they don't indicate what the disease is. For example, a headache may mean just examination stress or, very rarely, it may mean meningitis, or any one of a dozen different diseases.

Signs of disease are what physicians will look for on the basis of the symptoms. Signs will give a little more definite indication of the presence of a particular disease. Physicians suggest for tests to confirm the disease further.

### 13.5 Confirmation of Disease

Unhealthy conditions are expressed by symptoms. Symptoms like having pain in limbs or feeling weak do not confirm the presence of a disease. Confirmatory tests can only ascertain the type of disease. Nowadays several forms of tests are possible medically and by such tests on certain samples of our body like mucous of cough(sputum), blood, urine and stool a disease may be confirmed.

- Find out from a doctor what all can be determined from test of mucous, blood, urine and stool.

#### One disease many symptoms

Ill state of our body can be expressed in many ways like having cough, cold, fever, loose motion, headache, stomach ache, pain in limbs etc. These symptoms indicate a diseased condition. Diseases can have more than one symptom for example the symptoms of Tuberculosis(T.B.) are- cough and cold, headache, pain in limbs, feeling of breathlessness, loss of weight etc..

#### One symptom many diseases

A symptom most often can be due to different types of diseases. Headache can be due to tuberculosis or due to migraine or just common cold.

#### Activity-1

Find out the following in your locality (make a table to collect information)

- The persons suffering from a disease (write their names in a column, write the names of the disease that the doctor has told them they are suffering from in the next)
- Write the symptoms of the diseases in a third column
- What are the diseases that people with the same symptom have?

### 13.6 Grouping of Diseases on the basis of duration of infection

Often when we have a fall while riding a bicycle or while playing and get hurt, the infection there heals within a few days. Similarly common cold also lasts only for a few days. There are some diseases that

take a long for example if our normal cut would become badly infected it would take a long time to heal. Thus we may group diseases on the basis of duration of infection as following -

### **13.6.1 Acute diseases**

Some diseases that last for very short periods of time or with treatment they are cured in a short period of time. In general, health is not affected adversely due to them. These are like common cold, flu etc.

### **13.6.2 Chronic diseases**

Ailments that can last for a long time, even after prolonged treatment often lasting a lifetime are chronic diseases. An example is T.B. Due to prolonged infection the patient loses weight, feels weak, develops breathing problems etc.

Without proper treatment in proper time an acute disease may also turn to a chronic one. For example if cough and cold becomes persistent, it may take the form of a kind of asthma.

## **13.7 Disease and its causes**

There can be several causes of diseases. They may be mainly grouped as immediate or contributory.

If a small child in a certain area is suffering from loose motions, we may say that it may have been caused by polluted water containing a virus. In such a situation the immediate cause is the virus present in water. But other children of the area drank the same water and did not have loose motion. The reason for this could be that the child suffering from the disease did not have immunity against the virus.

Thus, when the child came in contact of the virus she/he developed the disease. Now why did the child not have immunity? A reason for this could be malnourishment i.e. the child did not have proper food to develop immunity. The body of the child may thus have lack of nutritional ingredients. It could also be possible that some characters inherited by the child renders her/him more prone to the virus. Thus lack of food and heritable causes which do not cause the disease in the lack of the virus are contributory causes. Another contributory cause may have been the conditions due to which the child did not get clean water. This may have been because the family lives in a place where due to lack of cleanliness, water may have become polluted.

- Did you or any of your family members ever suffer from diarrhea?
- Make a list of reasons for having diarrhea.
- Separate out the immediate causes from the contributory ones.

### **13.7.1 Infectious(communicable) diseases and its causes**

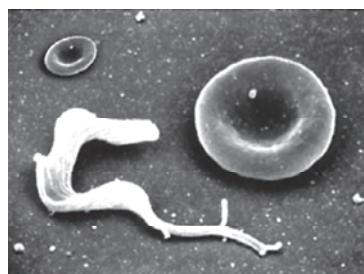
Other than the duration of the infection, diseases may also be grouped on the basis of the mode of spread of the cause. Infectious and non-infectious diseases come under this category. You are often asked to stay away from the patient so that you may not get infected.

We had studied in the example of the child having diarrhea that the immediate cause could have been a virus. There are several other organisms that are immediate causes of diseases like bacteria, protozoa, fungi, worms etc. People who come in contact with a patient who is suffering from a disease caused by any of these organisms may also get infected and contract the disease. Thus these are called infectious causes or agents of the disease. Most of the diseases caused by such agents are called as infectious diseases. Common cold, T.B., cholera, plague, skin diseases etc. are examples of infectious diseases.

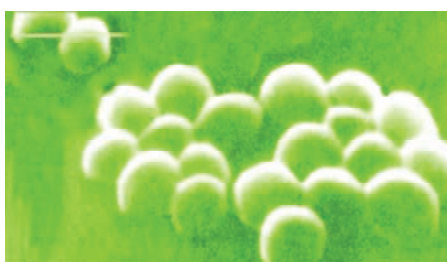
- Doctors nurses and other health workers are more in contact with patients than other people. Find out how they keep themselves safe from getting infected.



Leishmania- the protozoan causing kala-azar. The organisms are oval-shaped, and each has one long whip-like structure. A dividing organism has been shown by arrow and the cell of immune system (lower right) has gripped its whips to destroy it.



Trypanosoma- the protozoan responsible for sleeping sickness. The organism is lying next to a saucer-shaped red blood cell to give an idea of shape.



Staphylococci, the bacteria which can cause acne. 5 micrometer scale is shown at top left.



Adult roundworm (ascaris lumbricoides)- It is found in our small intestine. The ruler next to it shown four centimeters to give us an idea of scale.

**Fig. 2 : Different infectious agents**

### 13.7.2 Non infectious(non-communicable) diseases and their agents

There are some diseases that are not caused by infectious agents but their causes vary. They are not caused by external causes like microbes that can spread in the community. Instead, these are mostly caused by internal, non-infectious causes. For example, sickle cell anemia and some types of cancers are caused by

genetic abnormalities. Similarly, high blood pressure can be caused by excessive weight and lack of exercise. You can think of many other diseases like this where a person who comes in contact with a patient suffering from these diseases does not get infected. Thus these diseases are called as non- infectious diseases.

- Discuss with your friends whether it is fair to always stay away from a person suffering from a disease?

### **Do you know?**

#### **Peptic ulcers and the Nobel prize**

For many years, everybody used to think that peptic ulcers, which cause acidity- related pain and bleeding in the stomach and duodenum, were because of lifestyle reasons. Everybody thought that a stressful life led to a lot of acid secretion in the stomach, and eventually caused peptic ulcers. Then two Australians made a discovery that a bacterium, *Helicobacter pylori*, was responsible



for peptic ulcers. Robin Warren (born 1937), a pathologist from Perth, Australia, saw these small curved bacteria in the lower part of the stomach in many patients. He noticed that signs of inflammation were always present around these bacteria. Barry Marshall (born 1951), a young clinical fellow, became interested in Warren's findings and succeeded in cultivating the bacteria from these sources. In treatment studies, Marshall and Warren showed that patients could be cured of peptic ulcer only when the bacteria were killed in the stomach. Thanks to this pioneering discovery by Marshall and Warren, peptic ulcer disease is no longer a chronic, frequently disabling condition, but a disease that can be cured by a short period of treatment with antibiotics. For this achievement, Marshall and Warren (seen in the picture) received the Nobel prize for physiology and medicine in 2005.

### **13.8 Means of Spread of a disease**

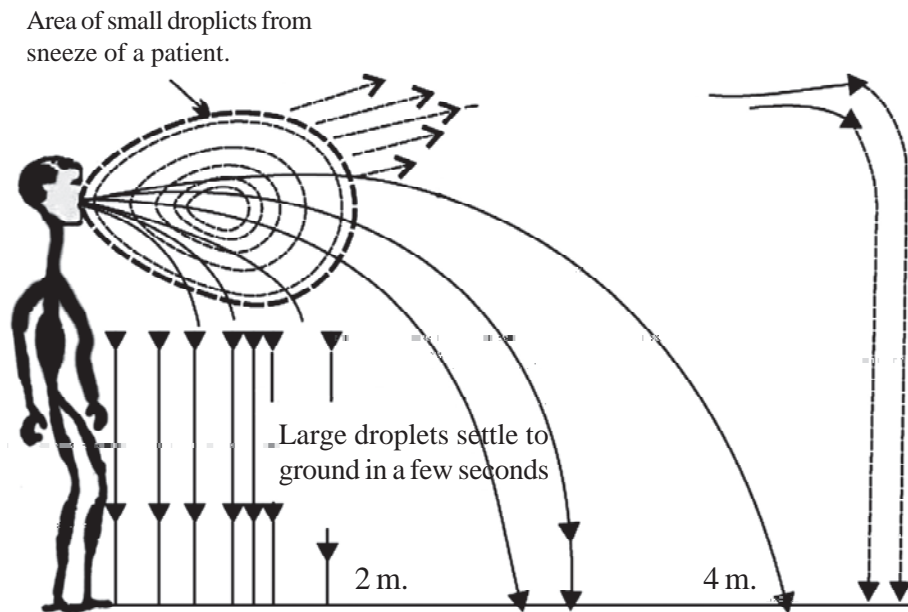
We had studied that when we come in contact with a patient suffering from an infectious disease, the possibility to get infected increases.

- How do infectious diseases spread from an affected person to someone else?

Infectious diseases may spread through various mediums like air, water, food and sexual contact.

Diseases like common cold, pneumonia and tuberculosis can spread through the air. This occurs through the little droplets thrown out by an infected person who sneezes or coughs. Someone standing close by can breathe in these droplets, and the microbes get a chance to start a new infection.

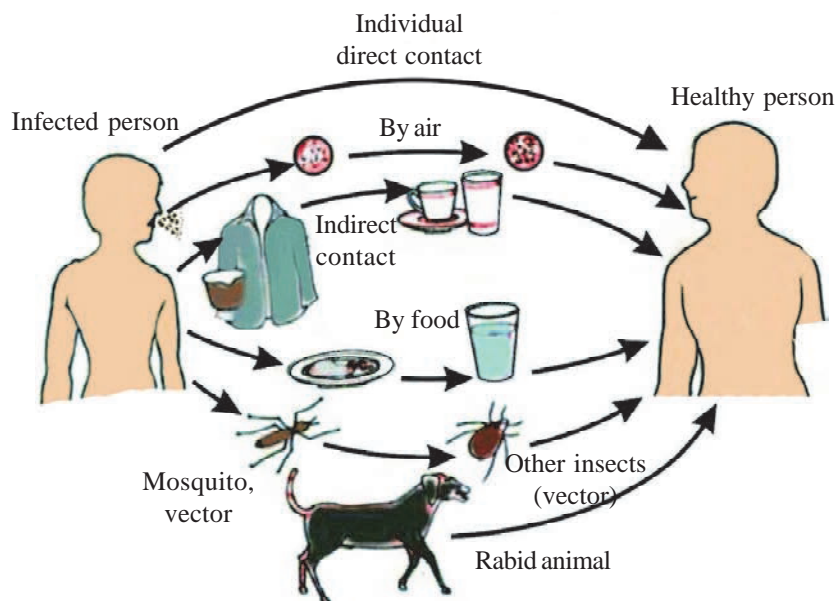




**Fig. 3 : Transmission of air borne infections and the distance of maximum infection**

We all have had the experience of sitting near someone suffering from a cold and catching it ourselves. Obviously, the more crowded our living conditions are, and less ventilated our homes, it is more likely that such airborne diseases will spread.

Infected or undercooked food like undercooked meat can also be a cause of several infections. Food affected with fungi may be a cause of severe food poisoning.



**Fig. 4 : General means of spread of infection**

Some diseases spread mainly by sexual contact like syphilis, and AIDS (Acquired Immunodeficiency Syndrome) caused by Human Immunodeficiency Virus (HIV). AIDS can also spread through blood-to-blood contact with infected people by blood transfusion or use of AIDS infected needles during injection or other surgical instruments during an operation or from an infected mother to her baby during pregnancy or through breast feeding.

- How do non-infectious diseases occur in humans?

### 13.9 Organ specific and tissue specific manifestation

We have studied that disease-causing micro organisms enter the body through air, water, food and physical contact. Where do they go then? They may go to any part of our body. There are many possible places, organs or tissues, where they could go. Do all microbes go to the same tissue or organ, or do they go to different ones? Different species of microbes seem to have evolved to different parts of the body. In part, this selection is connected to their point of entry. If they enter from the air via the nose, they are likely to go to the lungs. This is seen in the bacteria causing tuberculosis. If this bacteria reaches our bones via blood they cause breakdown of bones weakening them and causing the disease called as bone T.B. If they enter through the mouth, they can stay in the gut lining like typhoid causing bacteria. Or they can go to the liver, like the viruses that cause hepatitis.

An infection by HIV, that comes into the body via the sexual organs, will spread to lymph nodes all over the body. Malaria-causing microbes, entering through a mosquito bite, will go to the liver, and then to the red blood cells. We can imagine what the symptoms and signs of an infection will be if we know what the target tissue or organ is, and the functions that are carried out by this tissue or organ. If the lungs are the targets, then symptoms will be cough and breathlessness. If the liver is targeted, there will be jaundice. If the brain is the target, we will observe headaches, vomiting, fits or unconsciousness.

In addition to these tissue-specific effects of infectious disease, there will be other common effects too. Most of these common effects depend on the fact that the body's immune system is activated in response to infection. An active immune system recruits many cells to the affected tissue to kill off the disease-causing microbes. This recruitment process is called inflammation. As a part of this process, there are local effects such as swelling and pain of the infected part, and general effects such as fever and swelling of lymph nodes.

#### **Do you know?**

#### **Immune System**

All the life processes involved in identifying unwanted parts and infection causing agents and destroying them categorically without affecting the healthy cells and tissues of the body comprise the immune system. This system works against different disease causing agents (from viruses to worms) and helps in proper functioning of the body.



In certain situations the infected tissues may show an extreme general effect. Like in HIV infection, the virus goes to the immune system and damages its function. Thus, many of the effects of AIDS are because the body can no longer fight off the many minor infections that we face everyday. Like common cold can become pneumonia. Similarly, a minor gut infection can produce major diarrhoea with blood loss. Ultimately, it is these other infections that kill people suffering from AIDS.

It is also important to remember that the severity of disease manifestations depend on the number of microbes in the body. If the number of microbes is very small, the disease manifestations may be minor or unnoticed. If the number of the microbe is large, the disease can be severe enough to be life-threatening. The immune system is a major factor that determines the number of microbes surviving in the body.

- 'Immune system plays a major role in prevention of diseases.' Explain this statement with respect to AIDS

We live in an environment that is full of many other creatures apart from us. It is inevitable that many diseases will be transmitted by other animals. These animals carry the infecting agents from a sick person to another potential host. These animals are thus the intermediaries and are called vectors. The commonest vectors we all know are mosquitoes. In many species of mosquitoes, the females need highly nutritious food in the form of blood in order to be able to lay mature eggs. Mosquitoes feed on many warm-blooded animals, including us. In this way, they can transfer diseases from person to person or from other animals to humans.

### 13.10 Prevention and Treatment

Based on what we have learnt so far, it would appear that there are two ways to treat an infectious disease -

1. by reducing the effects of the disease
2. by killing the cause of the disease.

For the first, we can provide treatment that will reduce the symptoms. The symptoms are usually because of inflammation. For example, we can take medicines that bring down fever, reduce pain or arrest loose motions. We can take bed rest so that we can conserve our energy. This will enable us to have more of it available to focus on healing. But this kind of symptom-directed treatment by itself will not destroy the infecting microbe and the disease will not be cured and may recur. For example if we take medicine to reduce fever caused due to an infection the fever goes away for sometime only to recur again.

For that, we need to be able to kill off the microbes(virus, bacteria, fungi) by identifying them. These days there are several ways of testing that can give very specific results. Thus by testing the sputum(mucous of cough), blood, urine or stool etc. the infective agent is determined and the doctor prescribes medicines accordingly. For example blood tests confirm the presence of malaria and the patient is then given a certain dosage of drugs that can cure malaria. It is essential to take a complete dosage of the drugs for a particular time period for complete cure.

### 13.11 Prevention of diseases

We can lead a healthy life if we make conscious efforts to take such measures that would reduce chances of having diseases.

- Write about some ways that can prevent us from having a disease.

Leading a healthy life begins with a clean environment. Thus it is important to keep our surroundings free from dirt and filth so that we may keep a check on several disease causing agents. Sufficient amount of proper food and regular exercise will also keep us healthy.

We have studied in this chapter that diseases have a direct effect on the immune system of our body. If the immune system of our body is strengthened, we can remain healthy for a long period of time. These days several efforts towards ways of strengthening the immune system are being made so diseases may be ward of even before their infection. You may have heard about vaccination which is one of the ways of strengthening our immune system.

#### **Do you know?**

##### **Developing immunity**

Traditional Indian and Chinese medicinal systems sometimes deliberately rubbed the skin crusts from smallpox victims into the skin of healthy people. They thus hoped to induce a mild form of smallpox that would create resistance against the disease. Two centuries ago, an English physician named Edward Jenner, realised that milkmaids who had had cowpox did not catch smallpox even during epidemics. Cowpox is a very mild disease. Jenner tried deliberately giving cowpox to people (as he can be seen doing in the picture), and found that they were now resistant to smallpox. This was because the smallpox virus is closely related to the cowpox virus. 'Cow' is 'vacca' in Latin, and cowpox is 'vaccinia'. From these roots, the word 'vaccination' has come into our usage.

- Were you ever vaccinated? Find out from your parents the vaccines that were administered to you.

Vaccination is the process by which immunity towards specific disease is developed in our body. A mild controlled amount, usually inactive form of the disease causing microorganism is introduced in the body that alerts the immune system making it produce enough of agents that can fight against the disease causing microbe during an actual infection.



**Fig. 5 : Oral vaccination of Polio**

## Key words

Communicable diseases, non-communicable diseases, vectors, immune system, bacteria, virus, inflammation, vaccination, human immunodeficiency virus, acquired immune deficiency syndrome, chronic disease, acute disease



## What we have learnt

- Health is a state of physical, mental and social well being when a person is able to do one's work efficiently according one's ability.
- Disease means disturbed ease.
- Public cleanliness is important for individual health.
- Acute disease on treatment is cured in a short period of time like fever due to a minor injury while chronic diseases require prolonged treatment and last for a long time; example tuberculosis.
- Contributory causes for having a disease may be contaminated water or lack of nutritive elements in food.
- Diseases caused by infective agents are called as infectious diseases. For example- Cholera, typhoid, AIDS, TB
- Weakening of the immune system by AIDS eventually leads to death of the patient.
- The immune system keeps the body healthy by categorically destroying unwanted and disease causing agents.
- Immunity towards diseases caused by bacterial or viral infection like tetanus. whooping cough, diphtheria, polio, measles can be developed.
- Vaccination can prevent the cause of several infectious diseases.

## Exercise

1. Choose the correct option
  - (i) Which of the following is an infectious disease -  
(a) Night blindness    (b) Diabetes    (c) Blood pressure    (d) Cholera
  - (ii) What causes AIDS  
(a) Virus    (b) Bacteria    (c) Fungus    (d) Helminth
  - (iii) Which disease is not infectious-  
(a) Typhoid    (b) leprosy    (c) Small pox    (d) blood cancer

2. Suggest two conditions necessary for having good health.
3. Write any two causes of diseases.
4. During the past one year how many times did you fall sick? What was the disease?
  - (a) What changes would you make in your daily routine to ward off these diseases?
  - (b) What changes would you like to bring in your surroundings to save yourself from having the disease once again?
5. A child fails to tell whether she is sick. How will you find out-
  - (a) whether she is sick?
  - (b) what her sickness is?
6. What is the difference between infectious and non-infectious diseases? Give an example of each.
7. In which of the following situations you have maximum chance of falling sick -why?
  - (i) During your examinations.
  - (ii) You have travelled by bus or train for two days.
  - (iii) Your friend is suffering from measles
8. What is immunity? How does it affect our health? Explain with an example.
9. Give an example to justify that 'Prevention is better than cure'.

## Annexure

### Warning

**Ill effects of smoking-** Smoking affects the lungs adversely. Nicotine of tobacco affects lungs fatally. The internal lining of alveoli is ruptured, the gaseous exchange is affected as more carbon dioxide is produced and the layer of gaseous exchange is affected. This creates pressure on the heart and the incidence of heart failure increases.

Tobacco is prepared from the extracts of the leaves of *Nicotinum tabaccum*. Taking tobacco in any form can cause cancer on lips, internal lining of mouth, tongue, in the trachea, lungs etc.

**Ill effects of drinking-** People often faint after consuming too much alcohol. Alcoholism causes loss of concentration, affects the liver adversely and has ill effects on the brain among several other adverse effects. A person may have jaundice, hepatitis and liver cancer.

Other intoxicating substances like ganja, bhang, opium, cocaine are all dangerous to health as they cause hallucinations, mental agitation, hypnosis and loss of memory. The addiction towards these has become a chronic problem of society these days.