

# Chapter - 1

## Food and Human Health

Nutrition is the basis of life. Organism gets different types of nutrients from its surrounding atmosphere. These products by the process of digestion becomes part of the body and fulfils its different requirements. For maintaining good health, balance diet is required. Balance diet makes the body strong and it helps to increase the immunity power to fight against diseases and it also helps to make the mind sharp and healthy. In the absence of healthy diet, fatigue and different diseases may occur. On the basis of experiences it has been known that for the activities of life carbohydrate, protein, fat, minerals, vitamins and water should be available in sufficient quantity. Balance diet is one that contains all the essential nutrients. Deficiency or unavailability of any of the nutrient makes the diet unbalanced. If one or more nutrients are unavailable for a long period of time, then it is called malnutrition. The effect of malnutrition can be seen on the body in many ways. Different components of nutrition fulfill different

requirements of the body. Thus it is clear that if any nutrient is absent in diet then the corresponding work done by that nutrient will not be done.

### 1.1 Balance and unbalance food

One of the main reasons for malnutrition in our country is that people do not get adequate amount of balanced food. Many examples can be found where in due to bad habits, balance food is not taken up properly and the person shows the symptoms of malnutrition. The effect of malnutrition manifests both in physical and mental weaknesses. Here we will discuss some of the important side effects of malnutrition.

#### 1.1.1 Vitamin malnutrition

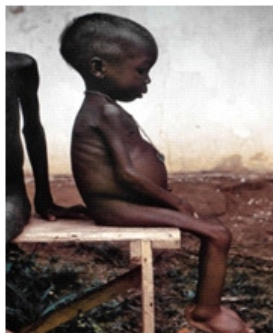
Vitamins are a very minute part of the food but they are functionally very important. Clear symptoms are seen if one or more vitamin are absent in the diet. The Table given below shows different diseases and their symptoms due to the deficiency of vitamins.

**Table 1.1 Diseases and their symptoms due to the deficiency of vitamins**

S. No.	Vitamin	Disease due to deficiency	Symptoms of the disease
1	Vitamin A	Night Blindness	Unable to see at night or in light
2	Thiamine (B 1)	Beri Beri	Low heart beat, weakness in muscles and nerves
3	Riboflavin (B2)	Riboflavinosis	Rupturing around mouth linings and skin of lips and memory loss
4	Niacin (B3)	Pellagra	Appearances of dry scales on tongue and skin.
5	Ascorbic acid (C)	Scurvy	Bleeding from gums, appearance of spots on the skin.
6	Calciferol (D)	Rickets	Bones of leg bends, inward bending of knees

### 1.1.2 Protein Malnutrition

Due to poverty people are unable to add protein in adequate amount in their food and becomes victims of Malnutrition.



**Fig. 1.1 a Kwashiorkor**



**Fig. 1.1 b Marasmus**

Chiefly small children are affected by it. Protein is an important nutrient for pregnant women and adolescents. Deficiency of protein causes kwashiorkor

disease. Child's stomach swells, loses appetite, behaviour becomes irritable, skin becomes pale, black, dry, spotty and starts rupturing. In addition to protein if nutrition lacks adequate amount of energy then body shrinks and becomes weak, eyes sink deep and become lusterless, this condition is termed as marasmus.

### 1.1.3 Mineral Malnutrition

Different types of minerals also play an important role in the functioning of the body and their deficiency causes different types of disorders in the body. Element Iron is a part of hemoglobin and its deficiency leads to paleing of face due to anemia, calcium makes bones strong and its deficiency makes bones weak and brittle. Due to the deficiency of Iodine the activity of the thyroid gland slows down and causes goiter.

**Table 1.2 Important Minerals, source and function**

S. No.	Name of the Element	Main Sources	Important Function
1	Sodium	Common salt, Fish, meat, egg, milk	Contraction of muscles, transmission of neural charges, electrolysis of body, maintaining balance
2	Potassium	All food products	Control of muscles, transmission of neural charges, electrolysis of body, operates different cellular reactions
3	Calcium	Milk, Egg, Green vegetables	Makes bones and teeth strong along with vitamin D
4	Phosphorus	Milk, green vegetable, pearl millet, finger millet, dry fruits, liver and kidney	Makes bones and teeth stronger with calcium
5	Iron	Liver, kidney, Egg, Meat, Blood, Pearl millet, Finger millet, Curd, vegetables, carrot, jaggery	Formation of hemoglobin, oxidation of tissues
6	Iodine	Salt, sea food, green leafy vegetable, sea fish, black berry, rock salt	Formation of thyroxine hormone

## 1.2 Human health

### 1.2.1 Properties of drinking water and harmful effects of polluted water

We humans are exploiting the available limited water sources in such a manner that in the near future we will have water crisis. Most of the usable water comes from rivers, lakes and underground sources. While using the water we are also polluting it. In this way we are hurting our life donor with double edged sword. It is useless to discuss about the uses of water, if you say "Water is life" then it would not be an exaggeration. Water is used for drinking, preparing food, bathing, washing utensils and clothes, agriculture and industries. Water is the only product found naturally on earth, which exists in all three states of matter, solid (ice), liquid (water) and gas (vapours). The water which we get contains many types of particles and microorganisms. Some of these are useful while the others are harmful for us.



#### Potable water should have the following properties-

Water should not have visible particles and vegetation, should not have harmful microbes, pH of water should be balanced, water must have adequate amount of dissolved oxygen. Water helps our body to carry out different responsibilities. All the metabolic activities of the body is carried out by water. Therefore a doctor also suggests us to drink minimum 8 glass of water per day. You must drink more water if you do more physical work. Metabolism of body works in a proper way if adequate amount of water is drunk. Toxic elements comes out of the body by drinking 8-10 glass of water per day, and the body remains diseases free. Adequate amount of water in the body makes the body healthy and energetic, and the body does not feel tired.

Water maintains adequate amount of fibres in the body that improves our immunity power and susceptibility to diseases decreases. Unnecessary fat don't get desposited in the body if abundant water is drunk. Sufficient intake of water reduces the chances of any kind of allergy to the body. In addition to that infection to lungs, asthma and intestinal diseases also do not occur. Regularly drinking a lot of water also avoids the danger of calculus. Drinking adequate amount of water protects us from disease like common cold.

#### Side effects of contaminated water-

Many diseases grips us if the potable water is contaminated. These diseases are caused by the presence of pathogenic microorganism in the water, which enters into the body with water. The main pathogens are viruses, bacteria, protozoa and worms. These pathogens causes cholera, dysentery like diseases and can easily affect anyone. Contaminated water can cause many communicable diseases. It may also cause dangerous diseases like hepatitis, flu, typhoid, jaundice etc. Dracunculiasis was once a serious problem in Rajasthan. A worm *Dracunculus medinensis* is the causing agent. The female always lays its eggs inside water out of the hosts (Human) body. This disease spread to other people if the contaminated water is used for drinking. No patient of drancunculiasis has been found after the year 2000, because of the efforts made by Naru abolition program. To stop its re-emergence and to rescue from water borne diseases drinking water should be filtered, boiled and cooled before use. Bathing, washing clothes in rivers, ponds should be prohibited and the water reservoirs should be cleaned frequently because "Healthy tomorrow is where, there is healthy water".

### 1.2.2 Obesity

Obesity is that condition when excessive body fat gets accumulated in the body to the extent that it starts to have harmful effect on health. This could reduce the potential age. Body Mass Index (BMI) is

the ratio of human weight and height. When the BMI is between 25 to 30 Kg/m<sup>2</sup> it is pre obesity stage and when the BMI is over 30 kg/m<sup>2</sup> than it is obesity.



**Fig. 1.2 Obesity**

Obesity is associated with many diseases such as, heart disease, diabetes mellitus, sleep apnea, many types of cancer and osteoarthritis.

There are many reasons for obesity **the important ones are-** Obesity and weight gain is due to the imbalance between intake of energy and its use. Eating high fatty food, Junk food, and synthetic food, less exercise, hypothyroidism, sedentary life style, without proper physical work, fat starts to accumulate in the body.

### 1.2.3 Blood pressure

Pressure exerted on the walls of the blood vessels by blood flowing in it is called Blood pressure. Arteries are those blood vessels which carries blood from the heart to all the tissues and organs in the body. Blood pressure of a person is expressed in systolic/ diastolic like 120/80, Systolic is the above number that shows pressure of arteries when the heart contracts and pumps the blood into arteries. Diastolic is the number below that shows the pressure of arteries when the heart relaxes and its muscles becomes loose.

The systolic blood pressure of a normal person is between 90 to 120 mm mercury level and diastolic blood pressure is between 60-80 mm. The equipment used for measuring blood pressure is called sphygmomanometer. Stephen Hales in 1733 measured the blood pressure of horses for the first time and Coplan had defined blood pressure in 1983.



**Fig. 1.3 Sphygmomanometer.**

**Low Blood Pressure** - It is when the blood pressure in your arteries and veins is abnormally low. When the blood pressure is extremely low then the oxygen and the nourishing food don't reach the important organs like heart, brain and kidneys, thus these organs stops working properly and can damage the organs permanently.

**High Blood Pressure** - It is due to excessive pressure in arteries. It is caused by anxiety, anger, jealousy, confusion, eating more food than needed. Consumption of white sugar, spices, oil, ghee, pickle, sweets, meat, tea, cigarette, alcohol sedentary life and absence of exercise. Timely diagnosis of high blood pressure is important.

Such patients should eat food containing potassium, like fresh fruits, packed food stuff should be avoided, amount of calcium and magnesium in food should be balanced. Eat more food item that contain fibre, saturated fats (Meat and vegetable ghee) should be reduced. In addition exercise regularly, walking for 30 minutes is the best exercise. Yoga, meditation pranayam should be done daily, smoking and drinking alcohol should be avoided.

## 1.3 Intoxicant and Human Health

Many people start using narcotic substances for illusion of pleasure but slowly they gets addicted to these substances and starts using these intoxicants in



more amount. Every intoxicant has its harmful side effect on the human body and makes the person, a permanent patient. Some of the intoxicants in common use in the society and their harmful side effects are given below.

### 1.3.1 Gutkha

It is prepared from betelnut pieces, kattha, lime, synthetic scent and thin metal sheets, tobacco is also mixed in some Gutkha. With the expansion of the pouch culture it is available in every village and molder. Ladies and children are also using it openly. Use of Gutkha not only causes economic loss but also harms physically. Muscles of the jaws become hard and the jaws will not open properly, this is due to a disease called sub mucous fibrosis. Synthetic products present in Gutkha contain many carcinogenic substances.

### 1.3.2 Tobacco

Tobacco is obtained from the leaves of the plant *Nicotina tabaccum*, which belongs to the family solanaceae. Leaves contain 1-8% of alkaloid named nicotine. Tobacco is used in many ways. Majority of people chew it with paan, (Betel leaf), Gutkha or lime, some inhale its powder or use it like paste to rub on teeth and gums. Tobacco is used in bidi, cigarette, cigar, chilam, hukkas or in other ways.

#### Following are the losses of tobacco use-

- I Chances of mouth, tongue, throat cancer increases by the regular use of tobacco.
- I Nicotine present in tobacco thickens the walls of arteries, due to which the blood pressure and heartbeat increases.
- I The rate of embryo development slows down if tobacco is used by pregnant women during pregnancy period.
- I Carbon mono oxide present in the cigarette's smoke damages red blood cells and affects the oxygen transporting capability of the blood.

The side effects of cigarette, bidi etc are seen not only on the user but are also seen in people sitting besides the user because the nicotine containing smoke in the air reaches their lungs too. That is why legally, smoking is prohibited in public places. According to the information received approximately 60 lakh people dies untimely every year because of tobacco use, out of these 50 lakh dies due to using it directly (Actively) and 10 lakh dies due to indirect use (Passively).

### 13.3.3 Alcohol

Alcohol is manufactured in many ways, but the main component in all is ethyl alcohol ( $C_2H_5OH$ ). Its percentage is different in different types of alcohol. The trend of consuming alcohol is increasing day by day and its side effects are emerging. Following are the harmful side effects of using alcohol.

After drinking alcohol it reaches liver through blood. Liver converts excess alcohol into acetaldehyde, which is poisonous.

Control and coordination of the body is affected by the consumption of alcohol, which reduces work efficiency, probability of accident also increases. Consumption of alcohol reduces memory power, affect the nervous system.

Alcohol causes fatty liver disease, which has an effect on the synthesis of protein and carbohydrates.

Due to its use the economic condition of a person falls and it also hurts the persons social status.

### 1.3.4 Opium (*Papaver somniferum*)

Opium is the dried latex obtained from the opium's capsule. The latex contains about 30 types of alkaloids, among them morphine, codine, nicotine, somniferine and papaverine are main. Morphine and codine are used to make painkiller medicines that's why it is cultivated. Many people use opium and its toxic product heroine to get the feeling of peace and

happiness. Offering opium is a common custom in the rural areas on occasion of mourning or happiness.



**Fig. 1.4 Opium capsule**

Many mothers in rural areas give opium to their small children for sleeping. Whatever the reason may be, use of opium makes a person addicted. Initially less quantity is taken but gradually the person is forced to increase its quantity. Many people are addicted to drinking boiled opium dried capsule (fruit). A person continues to remain sick because of his decreased immunity power, ultimately the person dies untimely. Doctors and NGO's can help to overcome this habit.

#### **1.3.5 Other Intoxicant substances**

Cocaine, cannabis, charas, hemp, hash, LSD (lysergic acid diethyl amide) etc are also intoxicants in trend. Young people start to use these for many reasons or get caught in this. Distance from family, increased criminal tendency, physical and mental weakness are the harmful side effects of using these products.

#### **1.3.6 Misuses of Medicines**

According to a survey on the demand of intoxicants in south Asia it was found that 42 percent use alcohol, 20 percent use opium, 30 percent use heroine, 6 percent use cannabis, and 18 percent people use other intoxic substances. According to a report people are also using doctors prescribed medicines like morphine, pethidine, buprenofrin, propoxifen, nitragipam diagipam as intoxicants. Use of smack has

also increased. In Punjab, Rajasthan, Uttar Pradesh and Gujarat the traditional consumption of opium is still continuing where as in North East part of India heroine injection is taken. Small children use nontraditional substances like, acetone, petrol, solvent, oil as intoxicant. Children growing up on streets easily get addicted to intoxicants and alcohol. They inhale shoe pasting gum, correction fluid, spray paint, nail polish, rubber cement, dried erasers, markers and gasoline. Trying to be unaware of the truth of the life and their hunger, these intoxicated children buy scary dreams, swelling in lungs, kidney failure, mental illness and the physical and mental problems which are never cured.

### **1.4 Adulteration in food products**

Today it is a common belief among public that all the things available in the market are adulterated. Anxiety of the public is natural. Havoc of adulteration is more on the items of our daily use. Adulterated food items are in abundance in our country. Adulterated Ghee, milk, oil, tea, spices are openly sold in the market. If someone gets ill after eating these products then the condition is even worse, because the life saving drugs are also fake. According to an estimate around 30-40 percent products are adulterated. Looking at the adulterated food products we can see that how easily the people who manufacture these products are duping us. First of all let us take the debated case of the cold drinks. In our country even the government does not have any information about the standardization of the quantity of elements used in making cold drinks. Infact the chemicals like lindane, meletian and chlorpyriphom mixed in cold drinks are considered responsible for cancer, nervous, reproductive diseases and damages the immune system.

During the manufacturing of the cold drinks phosphoric acid is mixed in it, which directly affects the teeth, it has the capacity to even dissolve the iron. The chemical ethylene glycol mixed in it does not allow

the water to freeze even at zero degree, commonly it is called as "Sweet poison". Boric, erithorbic and benzoic acid collectively increases the acidity of cold drinks, which causes burn in stomach, indigestion sensation in brain, irritability and acidity. It also hinders the development of bones. 0.4 pps lead is mixed in cold drink which is hazardous for brain, liver and muscles. Caffeine mixed in it causes Insomnia and headache.

Now a day milk too has also become a sample of adulteration inspite of being healthy. It has more ill effect than benefits. People are drinking urea, detergent, soda, poster colour, refined oil in the name of milk. Tests conducted by the health dept. of U.P. has brought out an alarming statistics that 25% of the people of the state are drinking useless adulterated and harmful milk. The condition of edible oil and ghee in the market is also very bad, Seeds of argimone, cheap palm oil are mixed in mustard oil.

It is common practice to mix vegetable ghee in native ghee, brick powder in chilli powder, artificial green colour on fennel, lead chromate and yellow soil in turmeric, sulphur in chilli and coriander, papaya seeds are mixed in black pepper. Chemical injection for bringing bright color in fruits and vegetables, lead and copper solution is sprayed for fresh appearance, and silver nitrate is sprayed on cauliflower for whitish color. Khansari dal is mixed in gram and tur dal, corn flour in gram flour, pulses and rice are artificially polished. Such colors are used in sweets which can lead to cancer and can bring deformities. Fake mava is coming into market. Adulteration in medicines have crossed all the limits. This can be judged from the fact that Mashelkar committee on the issue of counterfeit drugs and drug exchange has recommended death penalty to the people involved in this type of work.

Now the question arises what are the legal provisions available to over come this leprosy of adulteration? The truth is that the root cause of the

problem is that, there is absence of necessary standards in the country. With reference to safe food the main law in India is prevention of food adulteration act of 1954. The rule 65 of this law regulates the adulteration of insecticides and adulteration in food products, but this rule is failing to convict the guilty people, because of that people again do the same business after their release. Regardless of how tough the law can be made, deliberately or accidentally weakening the investigation work, the use of money, muscle and political influences and the slow paced judicial process does not change, nothing is going to happen. If the government is really determined to stop adulteration, then there is no two opinion that it cannot be stopped. The requirement is just a solid policy and the proper implementation of it.

### **Important Points**

1. Nutrition is the basis of life, balanced diet is required for the smooth operation of the body. Deficiency of protein, carbohydrate, vitamins, mineral in diet causes diseases.
2. Water is life, water is necessary for many activities in our daily life. Contaminated water can spread many diseases in humans.
3. Junk food and artificially synthesized food stuffs are attractive and tasty but these can cause disorders like obesity, blood pressure and diabetes.
4. Intoxicants like gutkha, tobacco, opium, alcohol, cannabis etc. are used by many people. These have negative effect on the body. Incurable diseases like cancer and many other disease are caused by some of these intoxicants.
5. Most of the products sold in market are adulterated, even than we are continually using them, because of that many harmful side effects are caused on our body.

### Practice questions

#### Objective type questions

1. Causal agent of dracunculiasis disease is -  
(a) Bacteria (b) Worm  
(c) Virus (d) Protozoa
2. How much is the normal blood pressure of healthy body -  
(a) 120/80 (b) 100/60  
(c) 140/80 (d) None of the above
3. Tobacco belongs to which family -  
(a) Malvaceae (b) Liliaceae  
(c) Solanaceae (d) Fabaceae
4. Main ingredient of alcohol is -  
(a)  $C_2H_5OH$  (b)  $CH_3OH$   
(c)  $CH_3COOH$  (d)  $C_6H_{12}O_6$
5. Which disease is caused by the deficiency of iodine -  
(a) Night blindness (b) Rickets  
(c) Sterility (d) Goiter

#### Very short type questions

6. Write the scientific name of opium plant.
7. What is the reason for fatty liver disease?
8. Which is the harmful ingredient found in tobacco?
9. Write the name of the blood pressure measuring instrument.
10. Write the name of the causing agent of dracunculiasis.

#### Short type questions

11. What do you mean by balanced diet and malnutrition?
12. What are the harmful effects of protein deficiency on human body?
13. What should be the qualities of drinking water?
14. Write down the harmful effects of contaminated water.
15. Which alkaloids are present in opium's milk?
16. Write the harmful effects of tobacco.
17. Write down the symptoms and reasons of submucous fibrosis.

#### Essay type questions

18. What is kwashiorkor disease? Write the symptoms and prevention measures.
19. How can you prevent the practice of opium in society?
20. Write the name of diseases and symptoms caused by vitamin deficiency.
21. Describe the harmful effects of cold drinks on our body.
22. Write an article on adulteration in food products.
23. Explain the losses due to minerals malnutrition.

#### Answer key

1. (b) 2. (a) 3. (c) 4. (a) 5. (d)