
UNIT 6 MALNUTRITION AND HEALTH

This unit will tell you about the relationship between health and nutrition. You will learn how to identify a malnourished state and the ways to prevent it.

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6.0 OBJECTIVES

Having studied this unit you will be able to

- realize the consequences of consuming insufficient food or a faulty diet
- state the common nutritional deficiencies in India and suggest preventive and remedial measures and
- recognize what obesity is and suggest preventive and remedial measures.

6.1 INTRODUCTION

Many people ask "Does nutrition make a difference to our health?" The answer is : Yes, it does. In many countries including our own, you will find people suffering from health problems because of poor nutrition and/or faulty eating habits. In fact you may be aware that food and nutrition are a matter of national and international concern.

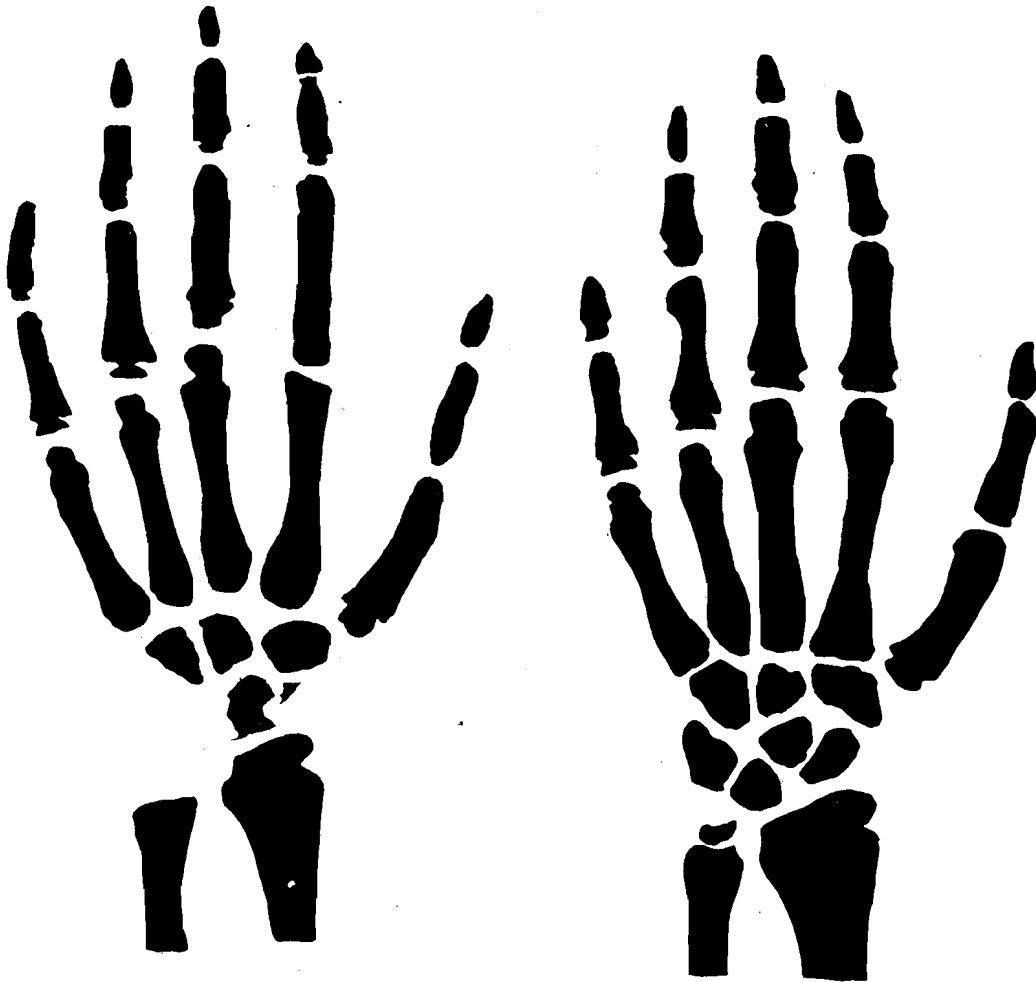
What happens if your diet is not adequate or well balanced? Sooner or later you will become malnourished. In this unit, you will learn what happens if you do not eat enough or eat too much or do not include foods from a specific food group.

6.2 WHAT IS MALNUTRITION?

Malnutrition is a state of improper nutrition balance in the body. As you know, some people eat less than what they need whereas others consume too much. As already explained in Unit 1 of this course, inadequate intake of food or a specific nutrient leads to Undernutrition, while Overnutrition means that a person eats more food than he/she needs. Both undernutrition and overnutrition are two manifestations of malnutrition.

Many times you may feel tired, you may have sores in your mouth, your lips may be cracked, or you seem to feel ill. Have you ever thought that this may be due to your getting insufficient food and nutrition? If you are undernourished you may not be able to work as efficiently as you could. If you continue to eat inadequate food for a long time

Figure 6.1 Wrist Bones of 7-Year old Girls



Effect of known undernutrition and known adequate nutrition, on wrist bones of two 7-year old girls. The diagram at the left shows only four wrist bones, the one at the right, the well nourished one shows seven wrist bones. The one on the right is regarded as normal for children of this age.

(Drawings are from Contemporary x-ray photographs)

your health and body functions will be affected more severely. Thus undernutrition even to a small extent does affect your health and your efficiency in work.

In India, there are lakhs of people who get insufficient food compared to what they need. We say that such people are marginally malnourished. The effects of marginal undernutrition are less easily noticed compared to those of severe undernutrition.

6.3 HOW DOES UNDERNUTRITION AFFECT YOUR HEALTH?

You may wonder what aspects of your life and health are affected by poor nutrition. Undernutrition affects growth in children, their physical and intellectual capacity and work performance as well as resistance to infection. It may even determine how long a person lives.

You already know that food is vital to life. If a child does not have enough food, it will not grow as well as it should. Naturally such a child will be smaller in stature. If the deprivation is in the first two or three years of life, you know that the child's brain will not grow fully. In addition, bones will not harden and new bones will not form. In Figure 6.1 we have shown you two wrists, one that of a undernourished and the other that of a well-nourished child. The well-nourished child has seven wrist bones, while the undernourished one has less.

Effect of known undernutrition and known adequate nutrition, are shown in the X-rays of two 7-year old girls. The X-ray at the left shows only four wrist bones, the one on the right, (the well-nourished one) shows seven wrist bones. The one on the right is regarded as normal for children of this age.

You know very well that your capacity to work and perform will depend on your being in the best state of health. Children who are hungry cannot concentrate on their studies. Lack of sufficient food may reduce your desire or motivation to work. Believe it or not, this has been proved beyond doubt. Undernutrition, therefore, can compromise your physical, intellectual and emotional performance. Deficiency of a single nutrient also has similar effects. You will find that people who have inadequate food are frequently thin and underweight.

Food provides you with substances that protect you against disease. If you are undernourished, you will not be able to resist infection effectively. If you are ill you do not feel like eating much. The more severe the illness, the greater will be your lack of appetite and the less your food intake. At the same time your body needs more food in order to combat infection. If you have diarrhoea or worms, you will not be able to absorb nutrients as you do normally.

6.4 OVERNUTRITION AND OBESITY

You learned that malnutrition means undernutrition or overnutrition. Overnutrition is due to consuming more food than you need. The most common problem of overnutrition is overweight and obesity. When you consume more energy than you spend, i.e. more than you need, your body stores the extra energy as fat.

You may ask: How fat is too fat or obese? Obviously just weighing yourself is not enough. Compare your weight with standard tables which give you the "ideal" weight according to height, age and sex. If your weight is more than 10 per cent above the "ideal" weight you are overweight and if it is 15 or 20 per cent more, you are obese.

Should you be concerned about being fat? You should. Fat people suffer from many health problems such as hypertension, stroke, diabetes, heart disease, etc. Fat people may die at a younger age. Extra fat in and around the chest makes it difficult for a fat person to climb the stairs makes them tired.

Assimilation of Food and
Effect on Growth and activity

How would you take care of this problem? Obviously by reducing the amount of food you eat so that your energy intake is less than your energy expenditure. One kg of fat in your body stores 7700 kcals. You can lose this extra kg of weight in two weeks by consuming 500 kcals less than you spend daily. These 500 kcals can be reduced by curtailing one's intake of oily foods, sweets, starchy foods, and if necessary, some cereals and dals. Advise a person to have a well balanced diet when he is trying to reduce weight. He/she should also be advised to do some exercise and be active so that he increases his energy expenditure. You will learn more about maintenance of body weight in Unit 7 of this course.

Thus food can determine how healthy you are, how productive you are, and even how long you live.

6.5 HOW WILL YOU DETECT MALNUTRITION?

One of the first steps in detecting malnutrition is to ask the person what and how much he/she eats. Compare the intake with the daily food guide. This will tell you whether he/she is getting too little or too much of a particular food group. Next weigh the person and compare his weight with the standard available. If the person is slightly underweight it may not matter much, but if he is drastically underweight, it means that he is undernourished. Next check the person's mouth, skin, eyes, inner lining of the eyelids, tongue and lower limbs. Lack of many nutrients affects these parts of the body. If the skin is rough and scaly or if there are cracks at the corners of the mouth, cracks on the lips, bleeding gums, it could be due to lack of several vitamins. If the inner lining of the eyelid is pale, the person could be anaemic. All these changes occur because of taking insufficient food.

Check Your Progress

1) What is malnutrition?

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2) Give four signs of undernutrition.

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3) Give three ways of finding out if a person is well-nourished.

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6.6 COMMON NUTRITIONAL DEFICIENCIES IN INDIA

You have just seen the general effects of undernutrition. Many people may eat enough but foods from a particular food group may be missing in their diet. Thus they may suffer

from deficiency of a single nutrient. Some of these deficiencies can lead to permanent damage and disabilities. In India, we face some problems which adversely affect health and are a cause for concern. In undernutrition, the common problems are protein energy malnutrition, vitamin A deficiency, anaemia and goitre.

Let us now discuss these problems. It is important to bear in mind that no nutritional problem manifests itself overnight. The number of people who suffer from severe deficiency of any nutrient are few in comparison to the thousands or lakhs of people who are marginally undernourished and who may not have visible symptoms.

6.6.1 Protein Energy Malnutrition

As you already know, protein and energy are essential in every function that you have to perform. You need energy even to lift this book and sit and read it. If you have a cut or wound, you need protein to heal it. You need protein for normal body functions, but more importantly, a child needs energy and protein to grow. Children need more protein in relation to their body size than adults do.

When you do not eat enough, you do not get sufficient energy. If this goes on for sometime, you will lose weight. Soon you may become underweight for your age. Your body will begin to use its fat stores and then its own protein in order to keep alive. Thus even if you eat enough protein you may suffer indirectly from protein deficiency in addition to energy deficiency. Protein and energy deficiency go hand in hand so that public health officials have adopted an abbreviation for these overlapping deficiencies: PEM or PCM i.e., protein energy malnutrition or protein calorie malnutrition. PEM occurs in people of all ages, even adults, but is found more frequently in children. It is seen more easily in children, and you will perceive this as slowing down or decrease in growth. An adult will be underweight.

When energy is predominantly insufficient the deficiency is called Marasmus. The predominant protein deficiency disease is called kwashiorkor. In India you will see marasmus more frequently than kwashiorkor, because the problem is of not getting enough food to eat. Thus marasmus is caused by inadequate intake of food or starvation. It is the most widespread nutritional problem in the world. What does a marasmic child look like? From Figure 6.2 you will see that he is just skin and bones, his ribs are visible, his skin is thin and wrinkled and his face looks large compared to the rest of his body. Marasmus occurs most commonly in children from six months to two years of age, usually because it has been neglected from early infancy. You must remember that the brain grows to its full size in the first two years of life. Thus marasmus impairs brain development and may permanently affect the child's intellectual capacity.

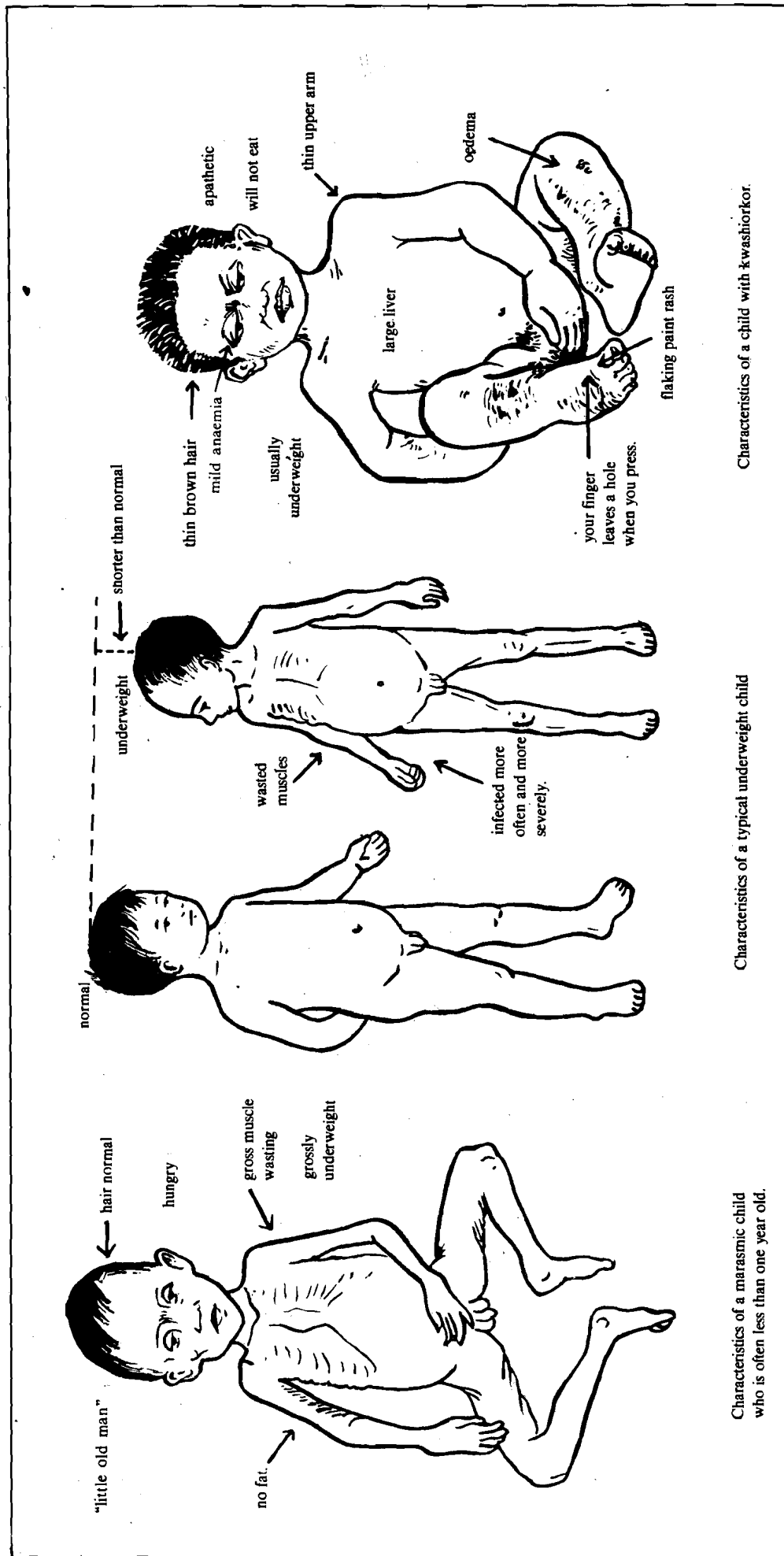
In India kwashiorkor occurs infrequently. The word kwashiorkor means "the disease the first child gets when the second one is born". In other words it is the disease of the displaced child. It is easy to see how this belief arose. When a mother who is breast feeding her first child has another, she shifts the first child to a diet of starchy gruels in order to put the new baby on the breast. Thus, if a child gets foods which gives him energy but little protein, he develops protein deficiency. Kwashiorkor typically sets in around the age of two. It stunts growth. Compared to the marasmic child (Figure 6.2) you will see that this child does not look thin because his limbs and face are swollen due to water retention. His skin may be patchy, sometimes he may have sores which do not heal. You will find that children suffering from PEM are weak, fretful, inactive or apathetic. They also fall ill easily.

You will be interested to know that adults may also suffer from kwashiorkor, although it is very infrequent. It is, however, likely to occur in those people who are chronic alcoholics and suffer from liver damage.

6.6.2 Vitamin A Deficiency

Your body can store upto a year's supply of vitamin A. If you do not eat good food sources of vitamin A, deficiency symptoms will appear after your stores are used up. Of course, if the stores are inadequate then the deficiency will appear sooner. Vitamin A is necessary for normal vision and for a healthy skin. It is also essential for growth. Thus in vitamin A deficiency, you will find that growth of children is affected. More importantly eyesight is also affected. Initially the person cannot see well at dusk or adjust when he goes from a well-lit

Figure 6-2 Protein Energy Malnutrition in Children

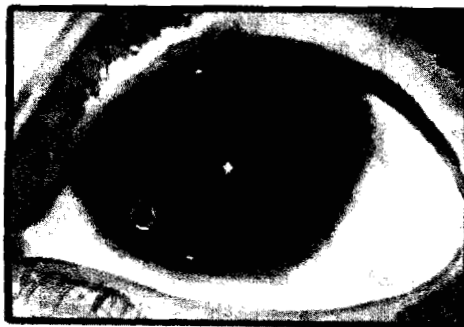


Characteristics of a child with kwashiorkor.

Characteristics of a typical underweight child

Characteristics of a marasmic child who is often less than one year old.

Figure 6-3 Changes in eyes



Characteristics of Vitamin A deficiency

room into the dark. This is called night blindness. As the deficiency becomes severe, the person may become blind (Figure 6.3).

Vitamin A deficiency is second only to PEM as a nutritional problem which is afflicting the young in India and other developing countries. You can prevent the deficiency by including dark green leafy vegetables, yellow and orange vegetables and fruits, milk, liver, etc. in your diet. If you encounter somebody already suffering from the deficiency, you can give him vitamin A concentrates or codliver oil, which is a very rich source of vitamin A. Please be sure to check the dosage with a health professional when you use a concentrated source of the vitamin.

6.6.3 Anaemia

Among all the nutrient deficiencies, anaemia is the only one which is not easily noticeable even when it is quite severe. It is a problem for millions of people and in most cases is due to a deficiency of iron. Deficiencies of other vitamins and protein could also cause anaemia. Anaemia is caused by many factors, one of which is insufficient food. Other factors are failure of the digestive tract to absorb any of the essential nutrients, infections, having worms or parasites. Many children may be anaemic because they have worms. You can take care of this with medicine and good hygienic practices.

Blood loss also leads to anaemia. Women are more likely to become anaemic than men. During growth, as the body increases in size, it needs to have more blood and the nutrients necessary for blood formation. Thus children are also susceptible to anaemia. Pregnant women are also likely to become anaemic.

What happens if you are anaemic?

Your body needs oxygen to release energy from the food you eat. This oxygen is carried by your blood. If you are anaemic, your blood cannot carry as much oxygen as you need and consequently you cannot get all the energy you need from your food. Children who are anaemic may not be able to run about or play and may not do well in their studies. Anaemic persons feel tired easily and are unable to work hard. You will find that an anaemic person looks pale. Many people complain of breathlessness and some people complain of headaches.

All these symptoms disappear if you take enough green leafy vegetables, dals, wheat, rice flakes and liver. You will be able to absorb iron better from these foods if you take some vitamin C and/or protein with them. You need not worry because many green leafy vegetables have enough vitamin C in them. Dals, liver, meat are good sources of protein which will help in the absorption of iron.

6.6.4 Goitre.

Goitre is enlargement of the thyroid gland in the neck. due to the deficiency of iodine Iodine as you may know already, is needed for the production of hormone thyroxine secreted by the thyroid gland. Thyroxine controls the rate at which your body uses oxygen. If you do not get enough iodine, the gland enlarges in an attempt to trap as much iodine as possible. As a result, you will see the enlargement in the neck.

Goitre is estimated to affect 200 million people over the world. You will find that a person who has goitre is lethargic and feels tired. Sometimes he/she may have constipation. If a pregnant mother has iodine deficiency, her child may suffer from irreversible mental and physical retardation. This is known as Cretinism.

What can you do to prevent or cure iodine deficiency? Iodine is normally present in the soil. In the hilly areas, the soil has very little iodine, therefore foods grown here are poor sources of iodine. In comparison, soil in the coastal areas is rich in iodine. As far as food is concerned, seafoods like fish and shell fish are good sources. All over the world however, people have found it useful to fortify common salt (the salt you add to food) with iodine. You must have read in the newspapers that the Government of India is fortifying salt with iodine.

 Check Your Progress

4 What is Protein Energy Malnutrition? What are its causes?
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5 How can you prevent Protein Energy Malnutrition
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6 How will you prevent vitamin A deficiency and anaemia?
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7 Which foods will you restrict in order to lose weight? Which foods are likely to be filling and yet have a lower energy content?
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6.7 LET US SUM UP

Malnutrition is a state of improper nutrition in the body involving under and overnutritional states. Major nutrition problems are protein energy malnutrition, vitamin A deficiency, anaemia, and goitre. PEM is seen mostly in children due to lack of energy or protein or both. Vitamin A deficiency affects vision and growth. Anaemia causes weakness, pallor, fatigue and more importantly decreases the attention span and capacity to work. It is common among women and children. Obesity is the most common overnutrition problem caused by eating more food than one needs. It entails many health hazards. In order to lose weight you need to change eating habits and do some exercise regularly.

6.8 GLOSSARY

Goitre	: Iodine deficiency disease
Kwashiorkor	: A protein deficiency disease
Protein Energy Malnutrition	: Deficiency of protein or energy or both
Marasmus	: Deficiency disease due to starvation or deficiency of calories from any source
Obesity	: Excessive body fat: often defined as being 20 per cent or more above the ideal weight
Overweight	: Body weight more than 10 per cent above the ideal weight

6.9 ANSWERS TO CHECK YOUR PROGRESS

- 1 Malnutrition is a state of improper nutrition balance in the body. It includes inadequate intake of nutrients or undernutrition and more than the required intake of nutrients or overnutrition.
- 2 Cracking of lips
Tiredness
Decreased resistance to infection, slowing of growth in children
- 3 a) Take weight and compare with the standard
b) Check condition of skin
c) Check mouth, tongue and corners of lips
- 4 Protein energy malnutrition is the deficiency produced by the insufficient intake of proteins and calories. Its main causes are insufficient intake of food and frequent illness like diarrhoea, fever, dysentery, etc.
- 5 PEM can be prevented by consuming a diet with adequate calories and protein to meet the body's daily requirement of these nutrients.
- 6 Vitamin A deficiency can be prevented by eating vitamin A rich foods such as dark green leafy vegetables, yellow and orange vegetables and fruits, milk, liver, etc.
Anaemia can be prevented by eating foods rich in iron such as green leafy vegetables, dals, wheat, liver, jaggery, etc.
- 7 Foods containing fats such as oily foods, butter, ghee, fried foods and foods rich in carbohydrates such as sweets, jam, rice, potato.

Vegetables and fruits are filling but have lower energy content.