
UNIT 8 DIET IN DISEASE: BASIC PRINCIPLES

Structure

- 8.1 Introduction
- 8.2 Can Food Cure Disease?
- 8.3 Diet Planning in Disease
 - 8.3.1 How Disease Affects Nutritional Requirements
 - 8.3.2 Influence of Disease on Food Intake and Dietary Pattern
 - 8.3.3 Types of Dietary Modifications
- 8.4 The Concept of Nutritional Care
- 8.5 Your Role in Nutritional and Preventive Health Care
- 8.6 Let Us Sum Up
- 8.7 Glossary
- 8.8 Answers to Check Your Progress Exercises

8.1 INTRODUCTION

What is the relationship between diet and disease? You already have many of the answers. Yes, poor diets can cause disease. Or to put it another way, some diseases can be cured or controlled by using particular types of diets.

This brings us to the point of trying to understand what is diet therapy and how should we use the diet to "manage" a disease? In this unit you will find a detailed discussion on the basic principles in diet therapy and dietary management.

At the end of the unit there is a detailed recapitulation of preventive aspects (Recap 1) to refresh your memory. The discussion centres around nutrients, their sources and role in prevention of nutritional deficiency disorders.

Objectives

After studying this unit, you should be able to:

- explain the role of the diet in curing and controlling diseases
- discuss basic principles of diet planning in disease
- identify your role in nutritional care in the community

8.2 CAN FOOD CURE DISEASE?

From ancient times we, in India, have endowed food with magical qualities. In the Vedic times, food was associated with divine attributes. This tradition was prevalent in other societies as well—ancient Egypt for example.

Night blindness was a well recognised disease in ancient Egypt. The cure suggested was to apply to the eyes juice squeezed from cooked liver! The ancient Greeks recommended that the patient eat cooked liver in addition to applying cooked liver oil or juice to the eye.

This is a good example of how man discovered the healing powers of food—perhaps initially by accident. Later these patterns became well established and were described in medical texts. The astonishing fact is their proven value in treating disorders primarily caused by lack of food and nutrients.

Another dramatic episode in man's search for a cure is the story of scurvy. Scurvy is caused by vitamin C deficiency. Fresh herbs, lemons, oranges and other citrus fruits were found to be very effective in preventing and controlling scurvy.

These episodes in the history of man's battle against disease clearly illustrate the fact that food can cure certain types of diseases. It is quite evident, however, that the diseases which can be cured by food or nutrient concentrates are caused by deficiency of particular nutrients. The disorders are cured by giving food sources rich in the nutrient that is otherwise lacking in the diet.

This does not mean that food and the nutrients it contains can cure all diseases. However there is no doubt that food can help to control several ailments. Diabetes is a common example. Mild cases of diabetes which manifest themselves in middle aged persons can usually be controlled using diet alone.

Phenylketonuria (PKU) is a genetic disease caused by inability of the body to utilize the amino acid phenylalanine. As you are aware, amino acids are the building blocks of proteins. Young children with PKU have to be given a diet which is almost free of phenylalanine. Otherwise they become mentally retarded. This shows us that PKU cannot be cured but dietary measures can keep it in check.

There are several other diseases which cannot be cured by food. Diseases caused by bacteria and viruses are obviously treated with antibiotics or sulpha preparations. Even in such cases good food is essential to prevent the patient from becoming weak. It also promotes quick recovery.

You will come across several other examples in this block to illustrate the role of food in the treatment of disease. From the previous discussion you would have realized that diseases can be of three types:

- I. Diseases or disorders caused by nutrient deficiency.
- II. Diseases which have several causes some of which are food and nutrient-related.
- III. Diseases which have no direct food or nutrient-related cause.

Giving foods and nutrients in concentrated form is effective therapy for those diseases we have mentioned in the first category/type. Food and diet plays an all important role in the treatment of these disorders.

Diseases in the second category include diabetes and coronary heart disease (CHD). Consumption of excessive amounts of sugar and refined carbohydrates can precipitate diabetes in individuals who are already genetically predisposed. Similarly consumption of diets containing excessive amounts of fats particularly saturated fats and cholesterol is believed to be a cause of CHD and the underlying process of narrowing of arteries by deposition of fat (atherosclerosis).

In the case of these diseases diet cannot cure disease. It can only help to check the progress of the disease process and also to prevent complications. Diet therapy, therefore, helps patients to lead a full life. Without it the disease can become uncontrollable irrespective of whether the patient is also prescribed drugs or not. In fact mild cases can be controlled by diet alone, as we mentioned earlier.

Infectious diseases are good examples of the third category. Some of these may be transmitted through food. However, food is not the direct cause. Treatment of these diseases usually do include a greater or lesser degree of diet therapy. For example, a febrile infectious disease (disease associated with fever, as you know) would require giving the patient additional energy and protein-rich foods in a suitable form. This would depend on whether the fever is chronic as in the case of tuberculosis or acute as in typhoid. You will study more details about these conditions later in this block (Unit 9). Here, we will only emphasize that a suitable diet is very important in helping the person to recover from infectious diseases.

8.3 DIET PLANNING IN DISEASE

A diet for a patient suffering from a specific disease is called a therapeutic diet. *Therapeutic diets are adaptations of the normal or regular diet.*

At this point you may wonder—why does the diet have to change in certain disease conditions? What types of changes are frequently made? And finally, do we need to make dietary modifications only in the case of persons suffering from a disease or also for those who are likely to suffer from a disease (i.e. individuals who are at risk)?

You just need to wait a little while for the answers to these crucial questions. To arrange the information systematically, we will discuss the issue with respect to:

- How disease affects nutritional requirements
- Influence of disease on food intake and dietary patterns
- Types of dietary modifications

8.3.1 How Disease Affects Nutritional Requirements

Several diseases bring about changes in the body's need for nutrients. Why? The reason is usually a change in metabolic or physiological processes as well as accompanying changes in the structure and/or function of specific organs and tissues.

A few examples will help to clarify these aspects.

Example A: Gopi is suffering from nephritis. (Nephritis is an inflammatory condition of the kidneys i.e. the kidney cells or nephrons). Her kidney function is affected and she is unable to excrete electrolytes such as sodium and chloride resulting in their accumulation in the body.

Example B: Kartik completed his 45th birthday last week. He has been suffering from diabetes for five years now. Due to lack of insulin (or lack of functional insulin) his body is unable to utilize carbohydrates efficiently.

Example C: Raju is suffering from typhoid. He is extremely weak and has lost a lot of weight. High fever continues to trouble him.

Can you predict which nutrient requirements will be influenced in each case?

In nephritis the inability of the kidneys to function effectively result in accumulation of water, electrolytes, urea and other waste products in blood and other tissues. So in Gopi's case, intake of sodium and protein has to be restricted. This is because breakdown of protein results in production of urea which must be excreted. Carbohydrates are emphasized. Kartik's diet, on the other hand, should not include carbohydrates such as sugar but complex carbohydrates (such as fibre and starch) need to be emphasized. Fat usually is restricted and should be of the unsaturated type.

Raju has high fever. Fever pushes up the metabolic rate. If the metabolic rate increases, energy needs will also increase. In other words, Raju would need a diet which supplies more energy. He is also losing weight because of loss of tissue. How is this to be replaced? Obviously by giving more protein.

We have used these examples to indicate just some of the changes in nutrient needs caused by these diseases. These are not the only dietary modifications required in diseases such as diabetes, typhoid and nephritis. Several others such as modification in texture and inclusion/exclusion of specific foods are required.

In general we can say that diseases that cause the loss of a particular nutrient would increase the need for that nutrient. On the other hand, if a disease results in accumulation of a particular nutrient, the intake of that nutrient is usually restricted or it may be given in a different form.

One point that we must emphasize here is the fact that sometimes the disease process does not alter nutrient needs and yet we may need to make dietary modifications. We will take a closer look at this aspect in the subsequent discussion.

Remember, however, that requirements depend on

- nutritional status (i.e. condition of health as influenced by intake of nutrients)
- modification in activity
- increased or decreased metabolic demands made by the illness and
- efficiency of digestive, absorptive and excretory mechanisms

Check Your Progress Exercise 1

1) "Food can cure as well as completely control most diseases"

Do you agree with this statement?

Yes

No

Give reasons for your answer.

.....
.....
.....
.....
.....
.....

2) Read the following statements carefully. Indicate whether each is true or false. Correct the false statements.

a) In fever energy needs go up and hence need for B complex vitamins go down.

.....
.....

b) Dietary modifications are not required in the case of all diseases.

.....
.....

c) A patient who is on bed rest will have lower caloric requirements provided no other factors specific to his disease condition intervene e.g. fever.

.....
.....

8.3.2 Influence of Disease on Food Intake and Dietary Pattern

The disease process very often influences both the quality and quantity of the diet. Further changes in meal frequency and other aspects of the dietary pattern may be required.

Disease may cause the patient to:

- lose appetite and therefore eat less
- feel more hungry and therefore eat more
- have problems with digestion or absorption of food or specific nutrients leading to changes in the types of foods which can be tolerated as also frequency of feeding.

Let us elaborate a little more on how illness modifies food acceptance. Some diseases result in marked anorexia or lack of appetite. Conditions associated with jaundice are notable examples. On the other hand, hormonal imbalances can make a person eat excessively resulting in overweight and obesity. Also specific foods may be poorly tolerated and lead to distention or flatulence (gas production). Others may irritate the gastrointestinal tract. A good example is the irritating effect of high fibre foods in conditions where the gastrointestinal tract is inflamed.

Now let us study the major therapeutic modifications of the normal diet. What are the types of quantitative and qualitative changes generally made? Read on to find out.

8.3.3 Types of Dietary Modifications

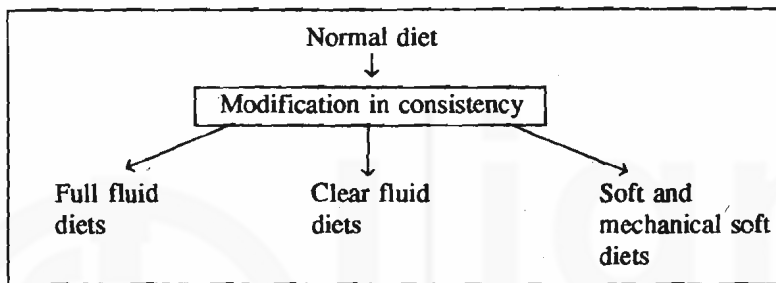
Our previous discussion has highlighted the fact that dietary modifications need to be made in the case of several diseases. We must remember that *therapeutic diets are always modified versions of normal diets.*

What are the types of dietary modifications that become necessary? Take a quick look at this checklist.

- Change in consistency (e.g. fluid and soft diets)
- Increase or decrease in energy content or contribution (e.g. low and high caloric diets)
- Inclusion of more or less amounts of one or more nutrients or other substances (e.g. low purine diet in gout or high vitamin A diet in deficiency of Vitamin A)
- Increase or decrease in fibre content
- Elimination of spices and condiments (e.g. bland diets)
- Inclusion or exclusion (i.e. giving or not giving) of specific foods e.g. diets in allergic conditions
- Change in intervals of feeding i.e. meal frequency

You will find examples of all these types of modifications in the later units of this block. At present we will spend some time explaining the first modification in this checklist—change in consistency.

Look at the following flow chart.



As you see, normal diets can be modified to fluid or soft diets. Fluid diets are of two types—full fluid and clear fluid. Fluid diets are used in febrile states, postoperatively or whenever the patient is unable to tolerate solid foods.

A clear fluid diet is prescribed when intake of nutrients must be restricted and when an acute illness or surgery results in a marked intolerance for food as may be evident by nausea, vomiting, anorexia, distention and diarrhoea. Obviously a clear fluid diet aims at replacement of fluids and supplies very little of nutrients. This is the reason why it cannot be continued for long.

A full fluid diet, on the other hand, is prescribed whenever a patient is acutely ill or is unable to chew or swallow solid food. A full fluid diet includes all foods liquid at room temperature and at body temperature. Such a diet can be continued for relatively long periods though iron supplementation becomes necessary.

Let us now talk about the soft and mechanical dental soft diets. The term “soft” refers to the fact that foods included in this type of diet are soft in consistency, easy to chew and made of simple, easily digestible food. It also contains no harsh fibre or strong flavour. A soft diet may be used in acute infections, some gastrointestinal disturbances and following surgery. It is usually recommended when a patient has to give up a full fluid diet but is yet not able to tolerate a normal diet. In this sense it is a dietary step between the full fluid and normal diet. Unlike the fluid diets, properly planned soft diets are nutritionally adequate.

Mechanical or dental soft diets are normal diets modified to help those who have dental problems e.g. elderly persons. No food is restricted unlike in the case of the customary soft diet we have just described. Removing the skin and seeds, cutting, or chopping into fine pieces are processes usually employed.

A word about methods of feeding would be helpful here. Feeding through the oral route (i.e. food by mouth) is the method of choice. It is used for persons who can eat, digest and absorb sufficient food to meet their nutrient needs. However, patients suffering from severe illness cannot consume foods even in the form of fluids orally. For such patients special feeding methods have been devised. Under our conditions, such special feeding methods can only be administered in hospitals or clinics. These feeding methods are:

- Intravenous feeding
- Tube feeding (nasogastric feeding)
- Gastrostomy (tube feeding directly into the stomach)
- Jejunostomy (tube feeding directly into the jejunum)

You would have noticed that gastrostomy and jejunostomy are also forms of tube feeding when a tube is inserted into the stomach and jejunum (part of small intestine) respectively by an operation. Highlight 1 gives an idea about the conditions where intravenous and tube feeding become necessary and the objective of these special feeding methods. You can read it if you are interested. In routine work you may not find the need to use these feeding methods.

HIGHLIGHT 1
Special Feeding Methods
<p><i>Intravenous feeding:</i> This feeding method is used when it is necessary to rest the patient's gastrointestinal tract. Fluids administered intravenously contain solutions of glucose, amino acids, salts and vitamins. Transfusions of whole blood or plasma are also frequently used.</p> <p>The major objectives of intravenous feeding are to</p> <ul style="list-style-type: none"> ● provide water and electrolytes to prevent dehydration and correct electrolyte imbalance ● make up loss of tissue protein and ● provide energy to meet daily needs. <p>Examples of disease conditions where intravenous feeding becomes necessary include surgery of the gastrointestinal tract, extensive burns, cancers of the mouth, pharynx and oesophagus resulting in obstruction of the passage of food, unconscious patients suffering from hepatic failure, diabetic coma, or brain injury.</p> <p><i>Tube feeding:</i> This method of feeding is employed when a patient is unable to chew or swallow because of deformity or inflammation of the mouth or throat, corrosive poisoning, unconsciousness, paralysis of the throat muscles and in several other conditions. Nasogastric feeding is used if the patient's entire gastrointestinal system except for the upper part is unaffected. However, if the oesophagus is affected, gastrostomy is indicated e.g. in cancer of the oesophagus. Similarly feeding through the jejunum is required in the case of patients with extensive inflammation and malignancy of the oesophagus and stomach or after oesophageal resection (removal of part of oesophagus) or total gastrectomy (removal of stomach).</p> <p>Nasogastric feeding has several advantages. Feeds can be planned to be nutritionally adequate. Large quantities of fluids can be given safely and the dangers of parenteral feeding can be avoided. Foods and drugs which are disliked by the patient can also be administered.</p>

Now let us turn our attention to the concept of nutritional care.

8.4 THE CONCEPT OF NUTRITIONAL CARE

Nutritional care as a concept first emerged in hospital settings, in clinics or rehabilitation centres. The term came to mean planning and administering diets for patients in an individualized manner. This implies that we cannot plan a diet for a patient without keeping the person and his or her special needs in mind. A nutritional care plan is prepared in most large hospitals after the following information has been carefully collected:

- the nature and possible duration of the disease
- underlying causes of the disease
- food habits of the person
- nature of dietary changes required
- problems such as food allergies

On the basis of this a dietary prescription is worked out by the doctor as also the need for any special feeding methods. The prescription should ideally specify the amount of calories, protein and any other nutrients that must be supplied. In addition foods to be restricted should also be clearly outlined.

This is the point where the dietitian in a hospital/clinic takes over and an individualized nutritional care plan is made. The plan includes

- i) an estimate of adequacy of the patient's usual dietary intake
- ii) any nutritional problems
- iii) plans for overcoming nutritional and other related problems
- iv) objectives for patient education
- v) notes on progress of the patient and
- vi) an evaluation of how successful diet therapy has been.

Several social, economic, psychological and emotional factors play a role in diet planning as you know.

In this context we also need to take a quick look at how nutritional care is administered in a large hospital or clinic setting. A patient is the responsibility of a "health team". The chief members of this team are the physician or doctor, the nurse and the dietitian.

However, at the community level the situation would be different. In this context, what would your role be?

8.5 YOUR ROLE IN NUTRITIONAL AND PREVENTIVE HEALTH CARE

At the community level you might find a limited health infrastructure. The primary health centre and the staff associated with it would probably be your main resource.

So what would be your role in involving the community in nutritional and preventive health care? In brief it should concentrate on the following:

- promoting preventive measures in dealing with nutritional problems/high risk groups in the population
- advising people who are already suffering from diseases/who are at risk of developing a disease
- putting people in touch with primary health centre/sub centre staff or other field level functionaries who can help
- informing the community about referral services where available (i.e. provisions for referring a patient to a larger hospital in serious cases)

You would notice the emphasis on prevention. This is of vital importance. People in the community may not be aware of facilities already being provided by the Government/voluntary organizations. Even if they are aware they may not be using the services. And further even if they do use these services they make no effort to help increase the outreach of a programme or services. This indicates the various levels at which you as a community worker can help.

In most cases of illness, information you can provide can help in management of routine cases. (Unless you are a doctor and you have access to a hospital, medical centre or clinic you would not be able to personally handle more serious cases.) So this is where your role can be crucial. Involving relatives and other community members is a constructive step and can be of great help in spreading information quickly.

We have mentioned the group of people who are at risk of developing disease as an important target group for education and advice. For this group our intervention can make the difference between maintenance of good health or appearance of a disease.

So now let's move on to diet therapy in disease in the next unit. But before we do that here's a quick look at the central theme: prevention of nutrition-related deficiencies/disorders. We have already covered these aspects earlier but this brief summary would help you.

RECAP 1: PREVENTION OF NUTRITIONAL DEFICIENCIES

If a person eats the right kind of foods in the required amounts, he or she will keep good health provided no other factors intervene. On the other hand, a poor eating pattern or eating too little or too much will result in poor health. These are both facets of malnutrition. When the diet supplies too little of one or more nutrients we suffer from a particular form of malnutrition called undernutrition. When the diet provides too much of one or more nutrients, overnutrition results.

If we stretch the same example further we would realize that mild forms of a nutrient deficiency would be treated and controlled by eating foods rich in that particular nutrient. In addition, tablets or capsules or syrups which contain the nutrient in concentrated form may be required especially in cases where the condition is moderate to severe.

These facts lead us to the realization that nutrients must be supplied to the body in the right amounts and proportions for a person to remain healthy. If the diet lacks or is deficient in a particular nutrient, the body will also become deficient in that nutrient. When this deficiency is prolonged or sufficiently severe, the person starts showing signs of a nutritional deficiency disorder.

The following chart indicates how food can be used to prevent nutrient deficiencies.

IF THE FOLLOWING NUTRIENT IS LACKING IN THE DIET	INCLUDE
1) Energy	Carbohydrate and fat-rich foods <i>Carbohydrate-rich foods</i> Cereals, roots and tubers, fruits such as banana, sapota, mango. Sugars are the most concentrated forms <i>Fat-rich foods</i> Nuts, oilseeds, fish and meat containing high amounts of fat; vegetable oil, ghee, vanaspati, butter are the most concentrated sources
2) Protein	Pulses, milk and milk products, eggs, meat, fish, nuts and oilseeds.
3) Vitamin A	<i>Retinol</i> Liver, egg yolk, cream, butter, ghee, milk <i>Beta carotene</i> Yellow and orange vegetables, green leafy vegetables
4) Vitamin D	Action of sunlight on skin Animal foods like eggs, butter, fish liver oil
5) Vitamin E	Vegetable oils, whole grains, deep green leafy vegetables, pulses, nuts and oilseeds
6) Vitamin K	Dark green leafy vegetables, egg yolk, liver
7) Thiamine or B1	Whole grain cereals, pulses, nuts, egg yolk, meat
8) Riboflavin or B2	Green leafy vegetables, milk, eggs, organ meats like liver, kidney
9) Niacin	Cereals, pulses, milk, nuts and oilseeds, organ meats, fish

10) Folic acid	Whole grain cereals, leafy vegetables, milk and eggs, organ meats like liver and kidney
11) Vitamin B ₁₂	Animal foods like eggs, organ meats
12) Vitamin C	Citrus fruits, amla, guava, capsicum, green leafy vegetables, green chillies
13) Calcium	Milk and milk products, some fish and sea foods, ragi, pulses, gingelly seeds, green leafy vegetables
14) Phosphorus	Eggs, milk, poultry, fish, cereals are rich sources. Present in most foods
15) Iron	Liver, kidney, spleen, whole cereals and pulses, (such as soyabean), green leafy vegetables.
16) Iodine Sea foods, crops grown on soil rich in iodine. Iodized salt can be used instead of ordinary salt in most cases.
17) Sodium	Table salt in adequate quantities, milk, egg white, meat, poultry, fish, green leafy vegetables (e.g. fenugreek leaves), some pulses
18) Potassium	Fruits, vegetables, meat, poultry, fish, pulses, whole grain cereals
19) Chloride	Include enough quantities of table salt
20) Magnesium	Nuts, oilseeds, pulses, whole grains, sea foods, dark green leafy vegetables, fish, meat

This fairly long chart is, in fact, a ready reference for you and will help you to remember the sources of several nutrients. Though we have used the chart to illustrate the foods that can correct the lack of specific nutrients in the diet, remember that these foods also become important in controlling and tackling nutritional deficiency disorders.

In addition to the nutrients we have already mentioned, fibre also has a valuable role to play in the prevention of diseases such as constipation and cancer of the colon. Fibre is a general term for substances which cannot be digested by the body and hence are not available. We have talked about some types of fibre which are complex carbohydrates, e.g. cellulose. However there are non-carbohydrate forms of fibre as well.

Research over the past decade has indicated the beneficial role of fibre in the prevention of disease and promotion of health.

Research has indicated that:

- complex carbohydrates (e.g. starch) and fibre-containing foods are helpful in controlling blood sugar levels in diabetic patients.
- some forms of fibre such as guar, pectin and lignin have a cholesterol-lowering action and hence may be of benefit in treatment of hyperlipidaemia (excess levels of lipids or fats in blood).
- consumption of fibre-containing foods is associated with lower chances of suffering from constipation.
- eating fibre-rich foods may protect the individual against colon cancer.
- consuming a diet rich in fibre may help to induce satiety (or a feeling of fullness) and therefore prevent overeating. This has implications for preventing obesity (i.e. extreme overweight).

However, there is also evidence to suggest that very high fibre intakes can be harmful. Under such conditions minerals such as calcium, zinc and magnesium are not available to the body. They appear to get bound to the fibre in the form of a complex.

Check Your Progress Exercise 2

1) Why is a therapeutic diet based on a normal diet?

.....
.....
.....
.....
.....
.....

2) Explain the following concepts briefly.

a) Dietary management

.....
.....
.....
.....

b) Nutritional care

.....
.....
.....
.....

8.6 LET US SUM UP

The major points emerging from this unit are:

- Diet therapy can completely cure some disorders while in others it can help to control a disease.
- Diseases may influence nutritional requirements and patterns of food intake. This determines the type of diet given.
- Both qualitative and quantitative changes are made in a normal diet in order to prepare a suitable therapeutic diet. It is important to note that all therapeutic diets are modified versions of normal diets.
- You can play a vital role in nutritional and preventive health care. Remember to emphasize both preventive and curative aspects in community nutrition and health education programmes.

8.7 GLOSSARY

Corrosive	Used in the context of poisoning by liquids or solids which damage the wall of the intestinal tract.
Inflammation	Swelling and tenderness of an organ or body part either due to injury or infection.
Postoperative	After an operation.
Nasogastric	Used with reference to feeding by a tube which passes through the nose into the oesophagus and finally into the stomach.

8.8 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) Food can cure only diseases which are caused by deficiency of one or more nutrients. It can also help to control some other diseases but not always completely. There are some cases of total control e.g. use of phenylalanine restricted diets in PKU. The degree of success in controlling a disease or curing it is of course, dependent on the severity of the condition e.g. diet therapy is all that is needed in mild non-insulin dependent diabetes mellitus or NIDDM. In the case of infectious diseases, dietary management can help reduce the ill effects of fever, vomiting and diarrhoea. A good diet can prevent episodes of infectious disease; it can also promote quick recovery.
- 2) a) False. As energy needs increase in fever, B complex needs also go up.
b) True
c) True

Check Your Progress Exercise 2

- 1) A normal diet meets the nutrient needs of a person of a given sex and age. It forms a useful starting point for making dietary changes based on the problems associated with a disease condition.
- 2) a) Dietary management refers to the use of the diet to cure or control a disease condition.
b) Nutritional care means the use of basic principles in nutrition and dietary management in controlling various disorders. It is applicable also in the case of diseases without a nutritional origin.