CHAPTER IV

NUTRITION AND HEALTH
Health and nutrition both are related with each other. Nutrition plays a vital role, as far as health of the people is concerned. Nutrition is necessary in the development of the quality of life. Nutrition is defined as the process of assimilating food and all processes of growth, maintenance and repair of the living body which depend upon the intake of food. "Good nutrition is a basic component of health. It is of prime importance in the attainment of normal growth and development and in the maintenance of health through life." Life can not exist without food and it is for this reason that every living organism strives its utmost to obtain its food requirements. The health of a person depends on the type and quality of food stuffs he chooses to eat. The role of nutrition is in the promotion of health and prevention of disease. Nutrition provides the energy for work by an individual. The energy required by the body for its activities depends on age, sex, weight, height, and physical activities. The resistance power of the body is directly influenced by the food stuffs.

People in different parts of the region prepare their food differently, depending on the availability of the food stuffs but no single food stuff contains all the nutrients in the desired proportion. Some food may be rich in protein, some in carbohydrate and some other in vitamins and minerals. Hence a variety of food stuffs is necessary to supply all the

nutrients in the desired proportion. During pregnancy, lactation, infancy more protective substances are required for the proper development of the body. An unbalanced supply of nutrients to the body may lead to illhealth conditions.

FOOD STUFFS

The food stuffs commonly consumed in the study area may be divided into the categories such as - cereals, pulses, vegetables, fruits, milk, flesh food, nuts and oil seed and sugar. These food stuffs contain different nutrient substances in different proportions.

CEREALS

Cereals are the main source of energy. Wheat, rice, maize, jowar, ragi and other millets belong to this category. Cereals are the cheapest source of energy providing 330 calories per 100 grams and protein contents 12.0 grams and form the backbone of our food supply. Cereals usually form the major part of our diets and provide largely the energy for doing work and the material for building tissues, especially in growing children. Besides these cereals also contain fair amount of vitamin B group. 'Ragi' is exceptionally high in calcium providing nearly 350 mg per 100 grams. Jowar contains nearly 10 grams protein and also rich in carbohydrates and vitamin B group.

PULSES

The pulses include several dals, grams, beans, and peas.
Pulses are rich in protein, iron as well as some vitamins such as thiamine and riboflavin and nicotinic and contain in general about 20-25 grams per 100 grams of pulses. Protein promotes the growth and development of the tissues of the body. Soyabean is the richest among pulses, it contain 40 grams of protein, 20 grams fat and 4 mg minerals in 100 grams. The protein of soyabean is of relatively high nutritive value. It can be used as 'dal' and other form like mixing it with powder, with atta, milk and curd. Oil extracted from soyabean is also full of proteins and fine in taste.

VEGETABLES

Vegetables are the main source of vitamins and minerals. Many of them are cheap and nourishing. Vegetables are health giving and protects us from illness. They are usually divided into three groups.

GREEN LEAFY VEGETABLES: There are various varieties of leafy vegetables viz. palak, amarnath, mint, cabbage, methi, and drumstick leaves. These are cheapest and more nutritious among protective food. Dark green leaves have high nutritive value. Generally green leafy vegetables are considered to be rich source of carotene (vitamin A), iron, calcium, vitamin B group and vitamin C.

ROOTS AND TUBERS: Potatoes, tapioca, onion, carrot, radish yam and several others are included in this group. They are all rich in carbohydrates and hence they yield mainly energy.
Yellow variety of yam and carrot are rich in carotene. Potatoes and tapioca contain large quantities of vitamin C, in times of cereal shortage they can serve as substitute for cereals. Roots and tubers are poor source of protein and fat and add variety to the diet. Palak and methi leaves are rich in calcium and iron which are required for the normal development of the bones. Iron is needed for proper blood formation. Vitamin A needed for good normal eye-sight is present as carotene in vegetables and carotene gets converted into vitamin A in the body.

OTHER VEGETABLES: Other vegetables are brinjal, beans, tomato, lady finger, french beans, onion etc. These also supply fair amounts of minerals and vitamins. Cluster, drumstick and onion contain fair amount of iron. These are consumed mainly to add variety to the diet.

FRUITS

Fruits are the main source of vitamins and minerals. Fruits are costly and it may not be within the reach of all to afford them daily. The need for fruit as an essential item in the diet is much reduced. Seasonal fruits are cheaper than other and are available easily. 'Amla' is an especially rich source of vitamin C. All kind of yellow fruits like mango, papaya contain carotene in addition and dried fruits like dates, apricots and raisins are sources of iron. Banana is a fruit rich in carbohydrate to get more energy also. Pectin a
kind of sugar present in fruits like guavas are easily
digestible and completely absorbed. The more ripe a fruit
the higher is its sugar content.

MILK AND MILK PRODUCTS

Milk is an excellent source of high class protein,
calcium, vitamin A and riboflavin. It is very easy to digest
and is recommended for people of all ages particularly for
children. People consume milk in a variety of ways; as whole
milk, butter, ghee, cheese, dried and condensed milk, khoa
etc. It is the main food for children - their entire energy
and other nutrients depend on their milk feeding, as far as
nutrients are concerned milk is the best and most complete of
all foods as it contains all the food factors needed to sustain
growth. It is used in different ways in different manner. Up
to the age of 2-3 years this is the only feeding for children.
In the study area, milk is concerned with each and every family
according to their purchasing power. In rural areas, mostly
cultivators have their own source for milk. Dairy is very
common in rural areas.

FLESH FOOD

Flesh foods are expensive but necessary in the daily
diet in a required amount. Flesh food are meat, fish, eggs
which are rich in protein of high biological value and in
vitamin B. Especially vitamin B₁₂ is contained in foods of
animal origin only it is not found in plant food. Generally
flesh foods are not good source of vitamin A but a good source of calcium.

Egg is a rich source of all nutrients except vitamin C. It contains 6 gram of protein, 6 gram of fat, 30 mg of calcium and 1.8 mg of iron. Eggs protein contains all the essential amino acids and has the highest nutritive value among dietary proteins.

The meat is of different varieties according to their sources. Meat contains 17 to 20 per cent of protein, good amount of fat and minerals and vitamins. It has poor source of vitamin D and calcium.

Fish is a good source of high quality of proteins containing 15 to 20 per cent. It also provides minerals such as calcium, iron, copper etc. The fish proteins are easily digested. The quantity of fat in the fish varies according to the type of seasons.

Animal foods are consumed by the non-vegetarian. Certain communities like Brahmin, Jain are pure vegetarians as such they are supposed not to consume animal food. Communities like Muslim, Sikh, Thakur, Scheduled Caste and Scheduled Tribes are non-vegetarians which consume animal food. These differences are due to their religion, custom and beliefs.
NUTS AND OIL SEEDS

Nuts and oilseeds are the main source of fats and oil. These items are essential in the diet of people. Fats are concentrated sources of energy; it provides twice as much energy as proteins and carbohydrates. If more food than necessary is taken the excess is stored in the form of fat.

Ground nut, coconut, cashewnut, cotton seed, sunflower and soyabean etc. are included in this group. Groundnut having 40 per cent of fat, contains 25 per cent of proteins. These varieties of pulses are equal in fat property to that in the pulses. They are also a good source of B group vitamins especially thiamine, riboflavin and nicotinic. Cashewnuts is a good source of vitamin C, coconut has 40 per cent fat. Soyabean contain 20 per cent fat and is a rich source of calcium and iron.

Fat and oil provide about 30 per cent of dietary energy. Fats help in the maintenance of body temperature. An excess of fat gets deposited beneath the skin. Fats remain for a long time in the digestive tract and get digested slowly.

SUGAR

Sugar is a good source of carbohydrate which provides mainly calories. It contains 383 Kcal per 100 grams and 11.4 mg of iron also. It is relatively cheap source of energy. At least half the required calories must be supplied by
carbohydrates which are absorbed through the intestinal mucosa as glucose. Normally the level of glucose in the blood is maintained at around 100 mg per 100 ml of blood. The activity of the brain cells is dependent on a constant supply of glucose. Fats are burnt totally only in the presence of glucose.

WATER

Water forms 65 to 70 per cent of our body weight and must be available at all times for the need of the body food. Men eat also liberate water by the oxidation of the nutrients. It provides iodine, fluorine and calcium to some extent.

Water is important for maintenance of body temperature, absorption and utilisation of food and excretion of waste material. The need for water is increased when there is excessive sweating, physical exercise, exposure to heat, fever, vomiting, diarrhoea and bleeding.

BEVERAGES

Beverages are drinks such as tea, coffee, cocoa etc. Drinks contain sugar, carbohydrates and energy. Coffee powder and tea leaves are prepared with water and when milk is added it forms a harmless complex. The nutritive value of a cup of tea or coffee is really due to its milk and sugar contents. Coffee in a cup has 98 and tea has 79 calories. Cocoa is obtained from cocoa beans and is rich in fat. Fruits juice like mango, orange, tomato are rich in proteins.
and contain vitamin C and A.

NUTRIENTS

The components of foods which fulfil all the basic functions are known as proteins, fats, carbohydrates, minerals and vitamins and are collectively known as nutrients.¹ They are present in most foods but in different amounts. These proteins form the chief substance of our muscles and organs and is an important body building material. Fats, carbohydrates and proteins constitute the fuels that are burnt inside the body and supply energy. Their burning also helps in maintaining body temperature. Minerals form the chief building materials of structures like bones and teeth. Vitamins are necessary to regulate the proper utilisation and assimilation of proteins, fats, carbohydrates and minerals by the body to attain proper growth and also to prevent certain diseases. Besides these, water which forms nearly two third of our body weight is also a necessary food element since it is an important constituent of body tissues. Water also acts as a vehicle to transport the other nutrients.

PROTEINS

Proteins are very essential for the growth and repair of human body. Proteins are a complex of organic nitrogenous compounds. Some proteins also contain phosphorus and iron

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and occasionally other elements. Proteins differ from carbohydrates and fat and they contain about 16 per cent nitrogen. There are two main dietary sources of proteins (i) animal sources; viz. eggs, milk, meat, fish etc. and (ii) plant sources viz. pulses, cereals, nuts, beans, oilseed, cakes etc.

Animal proteins are rated superior to vegetable proteins because they are biologically complete. Eggs, fish, proteins are best amounts of food because of their high biological value and digestibility. Vegetable proteins may be lacking in one or more of the essential amino acids. Pulses are the major sources of dietary pattern because they are readily available.

Proteins have a prime place in the functioning of the tissues. They contain carbon, hydrogen, oxygen and nitrogen. It is essential for the growth, development and replacement of wear and tear of tissues. They give strength to the body. They produce antibodies to protect the body against infection. Man require one gram of protein per Kg body weight. The requirement is greater during pregnancy and lactation 1.5 gram per Kg. A developing child needs 2 grams of protein per Kg body weight. Detail requirement of proteins are given in table below according to age group and body weight (Table 4.1).

The proteins requirements of men, women, boys, girls and children of different age groups differ from on another in degree per gram per day on one gram body weight. It is
### TABLE 4.1
REQUIREMENTS OF PROTEINS

<table>
<thead>
<tr>
<th>Age group</th>
<th>Body weight</th>
<th>Protein gm/Kg/day</th>
<th>Required gm/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>30 - 40</td>
<td>60</td>
<td>1.00</td>
</tr>
<tr>
<td>Woman</td>
<td>25 - 40</td>
<td>50</td>
<td>1.00</td>
</tr>
<tr>
<td>Boys</td>
<td>10 - 12</td>
<td>34</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td>16 - 18</td>
<td>50</td>
<td>0.94</td>
</tr>
<tr>
<td>Girls</td>
<td>10 - 12</td>
<td>36</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>16 - 18</td>
<td>50</td>
<td>0.88</td>
</tr>
<tr>
<td>Children</td>
<td>5 - 9</td>
<td>18/20</td>
<td>1.40</td>
</tr>
<tr>
<td></td>
<td>1 - 4</td>
<td>12</td>
<td>1.80</td>
</tr>
</tbody>
</table>

Source: Recommended dietary intake for Indian's, 1981. ICMR., Hyderabad.

shown in the Table No. 4.1. For example boys of 10-12 years age group need 1.25 gm proteins, 1 Kg body weight which girls of the same age group needs 1.17 gm which tells up of a minor difference in their proteins requirements. Likewise the boys of 16-18 years of age group would need 0.94 gm per day and the girls of the same age group 0.88 gm per day. Children of the 5-9 and 1-4 years need 1.40 and 1.80 gm proteins respectively on 1 Kg body weight. Thus proteins are essential for the physical development and growth of children.

**FATS**

Fats are concentrated source of energy. Fats provide...
twice as much energy as protein and carbohydrates. Butter, ghee, vanaspati and vegetable oils are the commonly used fats. They contain carbon, hydrogen and oxygen and are composed of fatty acids. Fat forms one of the essential constituents of our food. It may be of animal or plant origin. It helps in the maintenance of body temperature. An excess of fat gets deposited beneath the skin. It remains for a long time in the digestive tract and gets digested slowly.

CARBOHYDRATES

Carbohydrates are an important source of energy. It exists in the form of simple complex sugars. After absorption glucose is supplied to all part of the body. It is converted into glycogen and stored in the liver and muscles. Sugar, glucose, jaggery and honey are pure carbohydrates. Root vegetables like topioca and sweet potato and fruits like banana are rich in carbohydrates. Carbohydrate composes of carbon, hydrogen and oxygen. The optimum quantity of it in balanced diets is placed between 50 to 70 per cent of total energy intake. The carbohydrate reserve of a human adult is only about 500 grams when a man is fasting this reserve is rapidly exhausted.

VITAMINS

Vitamins are vital to the body and are present in minute quantities in most food stuffs. They are necessary for the maintenance of good health and growth. Some of the
vitamins are available externally in a different form and can be converted for use by the body. Vitamins are substances found in small amounts. They do not yield energy but act as catalysts in various body processes. A well balanced diet supplies in most instances, the vitamin's need of a healthy person. Vitamins are divided into two groups (i) Fat soluble A, D, E and K (ii) Water soluble B and C group. Each vitamin has a specific function to perform and deficiency of any particular vitamin leads to specific deficiency disease. Here are some of the important vitamins described.

Vitamin A: It is essential for the health of the skin and the mucous membranes and for good vision. It is readily secured in foods of animal origin, liver, eggs, milk, fish, curd, and butter. It is not destroyed by cooking. Fish liver oil is the best source of this vitamin. Papaya, ripe mangoes, carrot, palak, amarnath are also good sources. Vitamin A also found in milk, green leafy vegetables and yellow colour fruits which contain plenty of a substance called carotenes, which is converted into vitamin A in the body. It is required for good eye sight and smooth skin.

Vitamin B Group: There are three important vitamins in the B complex group - thiamine, riboflavin and nicotinic acid. As a result of a deficiency of these B vitamin, the mouth and tongue are affected. Foods like eggs, pulses, nuts and leafy vegetable are good source of the B group vitamins. A
deficiency of this vitamin leads to a condition called Beri-beri.

MINERALS

Minerals are needed for the formation of bones and teeth, maintenance of osmotic pressure of body fluids and for serving specific functions such as blood formation by iron and normal functioning of the thyroid by iodine. These minerals include calcium, iron, phosphorus, sodium, potassium, sulphur, iodine, zinc etc. Important minerals is given below:

CALCIUM: It is a major mineral element of the body. It is needed by the body for the formation and maintenance of bones and teeth, coagulation of blood, regulation of neuro-muscular irritability and for muscular contractibility. Natural source of calcium is milk, leafy vegetables, fish, cereals, etc. Pregnant and nursing mothers require more calcium. Children and infants need more for the body growth.

IRON: It is needed for blood formation. The body of an adult human contain 3-4 gram of iron and 75 per cent of this amount is found in the blood. Iron is the main constituent of haemoglobin, the pigment which carries oxygen to all parts of the body. On entry into the body, iron is avidly stored by the tissues of the body. The formation of red blood cell is a continuous process in the body and their life span is 125 days. Even after their destructive, iron is not excreted from the body but is used in the marrow again. It is present in green leafy vegetables, ragi, bajra, jowar, pulses, eggs.
and fruits. Requirement is doubtful in women due to the loss of blood during menstruation, pregnancy and lactation. An iron deficiency leads to anaemia.

**NUTRIENTS REQUIRED**

The various foods that we eat contain different amounts of proteins, carbohydrates, fats, minerals, vitamins, and other nutrients. A good diet is that which contains different foods in right proportion and amounts so that all the nutrients are provided in required quantities. In diet it should include a mixture of cereals, pulses, leafy vegetables and another vegetables, a fruit daily, fats, oil, a glass of milk every day, an egg a day, meat or fish. Vegetarians take larger amount of pulses as compared to non-vegetarians.

Energy provided by food is used for routine work. This energy is measured in terms of calories. The number of calories required by a person will vary with sex, age, and activity. The following persons need more calories than recommended (Table 4.2).

**NUTRITION IN PREGNANCY**

It is recommended that a pregnant women needs to have daily 300 to 400 calories of energy more than the normal requirement. One can obtain this additional energy by adding cereals, oils, sugar and pulses. An extra 15-20 grams of protein daily is required for proper growth of the foetus. It is good if animal foods such as eggs, meat, or fish, milk,
### Table 4.2
**Recommended Dietary Intakes of Nutrients**

<table>
<thead>
<tr>
<th>Group</th>
<th>Particulars</th>
<th>Calories (Kcal)</th>
<th>Proteins (gm)</th>
<th>Calcium (gm)</th>
<th>Iron (mg)</th>
<th>Vitamin A (ug)</th>
<th>Thiamine (mg)</th>
<th>Riboflavin (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Man</strong></td>
<td>Sedentary work</td>
<td>2400</td>
<td>55</td>
<td>0.5</td>
<td>24</td>
<td>3000</td>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Moderate work</td>
<td>2800</td>
<td>55</td>
<td>0.5</td>
<td>24</td>
<td>3000</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Heavy work</td>
<td>3900</td>
<td>55</td>
<td>0.5</td>
<td>24</td>
<td>3000</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Woman</strong></td>
<td>Sedentary work</td>
<td>1900</td>
<td>45</td>
<td>0.5</td>
<td>32</td>
<td>3000</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Moderate work</td>
<td>2200</td>
<td>45</td>
<td>0.5</td>
<td>32</td>
<td>3000</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Heavy work</td>
<td>3000</td>
<td>45</td>
<td>0.5</td>
<td>32</td>
<td>3000</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Pregnancy</td>
<td>2200</td>
<td>59</td>
<td>1.0</td>
<td>40</td>
<td>3000</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Lactation</td>
<td>2450</td>
<td>70</td>
<td>1.0</td>
<td>40</td>
<td>4600</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
<td>1220</td>
<td>22</td>
<td>0.5</td>
<td>20-25</td>
<td>1000</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Infants</strong></td>
<td></td>
<td>118/Kg</td>
<td>2/Kg</td>
<td>0.5</td>
<td>1 mg/Kg</td>
<td>1200</td>
<td>0.5</td>
<td>0.7/Kg</td>
</tr>
</tbody>
</table>

**Source:** National Institute of Nutrition (ICMR), Hyderabad: *Recommended Dietary Intakes for Indians*, P. 50
cord liver oil and fruits juice are consumed.

Every pregnant woman dreams of giving birth to a chubby, health infant. The foetus slowly depends upon mother for its nourishment. The nutritional need of a pregnant woman gradually increases as pregnancy progresses. Mother has to supply through blood stream, all nutrients needed for this growing foetus.¹

When the mother's diet is not nutritionally adequate she can not transfer the required nutrients to the foetus. Foetus then tries to draw its nourishment from mother's body reserves. This can affect the mother's health, if she is already malnourished than both mother and infant will be affected. There must be a regular and adequate intake of all other nutrients drawn from a wide variety of foods.

NUTRITION IN NURSING MOTHERS

The nursing mother needs more proteins since high quality proteins have to be synthesised by her for producing milk. Animal food like meat, eggs, fish helps much. It is proved that if the mother increases the food intake, she tends to produce more milk. Leafy vegetables like, amarnath, drum stick leaves also help in supplying nutrients. It is not desirable for nursing mother to consume species; because they carry odours which make the milk unpalatable to the body. Use of more water by the nursing mother to compensate the loss of body water is highly essential.

Even after birth, the new born continues to depend on the mother for its nourishment. Breast milk provides all the nutrients for the first 4-6 months. Compared to pregnancy, breast feeding imposes greater stress on the mother because the infant is older and rapidly growing. Therefore, he needs more nourishment than the foetus in the womb. The nutrients that go into breast milk are to be provided for formation of milk without affecting her own body resources. Even a mother with unsatisfactory diet can produce the same quantity of milk but this is done at the cost of her own health.

The mother’s diet ought to be more nutritious than what it was when she was not nursing. As the mother herself is involved in the child’s care her confidence improves. Her changed nutritional outlook helps to prevent replacing of infection in the child.

**NUTRITION FOR INFANTS**

Mother’s milk is the ideal food for infant. Breast milk would be needed for a period of 6 months than it is able to take supplementary foods. This is because usually often about 6 months of age mother milk is no longer sufficient to sustain growth. Supplementation with cereals, pulses, soft drink is essential. At the age of one year child needs 1 Kg milk or other solid foods containing pulses, vegetables and fruits.
NUTRITION FOR HEAVY WORKERS

A diet of a person depends on the nature of work. A person expends energy for daily activities which are of non-occupational nature such as sitting, standing, dressing, walking etc. For all these activities energy is required in normal. Additional calories are required for the performance of daily work. The diet of heavy workers should be rich in proteins, fats, vitamins and minerals and need more energy. This energy he can get mainly from cereals, pulses and fats.