

1. Details of Module and its structure

| Module Detail | |
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| Subject Name | Food, Nutrition for Healthy Living |
| Course Name | Food, Nutrition for Healthy Living |
| Module Name/Title | Balanced diet - II |
| Module Id | FNHL_10108 |
| Pre-requisites | General knowledge about Nutrients in Food - Micronutrients |
| Objectives | After going through this lesson, the learners will be able to understand the following : <ol style="list-style-type: none">1. The dietary guidelines formulated for Indian population2. The concept of food pyramid and how it aids in consumption of a healthy diet;3. The concept of the recommended dietary allowances;4. What is a balanced diet; and5. The importance of certain nutrients and food items during different stages of life. |
| Keywords | balanced diet , Vitamins, Minerals, Niacin, Folic acid, Cobalamin, Vitamin c, Calcium, Sodium, Potassium, Iron, Iodine, Zinc, Fluorine |

2. Development Team

| Role | Name | Affiliation |
|---------------------------------|--|--|
| National MOOC Coordinator (NMC) | Prof. Amarendra P. Behera | CIET, NCERT, New Delhi |
| Program Coordinator | Dr. Mohd. Mamur Ali | CIET, NCERT, New Delhi |
| Course Coordinator (CC) / PI | Prof. Poonam Aggarwal Dr. Suniti Sanwal | DGS, NCERT New Delhi DEE, NCERT New Delhi |
| Course Co-Coordinator / Co-PI | Dr. Yash Paul Sharma | CIET, NCERT, New Delhi |
| Subject Matter Expert (SME) | Ms. Preeti Kamboj Dr. Neena Bhatia | Lady Irwin College, University of Delhi, New Delhi Lady Irwin College, University of Delhi, New Delhi |
| Review Team | Dr. Aruna Mohan (Retd.) | Gargi College, New Delhi |

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1. Introduction

The concept of balanced diet can be considered parallel to the concept of a healthy diet.

Fundamentals of a balanced diet: A balanced and healthy diet may vary based on the individual needs (eg. age, sex, lifestyle pattern, level of physical activity), cultural setting, locally available foods and dietary customs but the basic principles of what constitute a healthy diet remain the same. A healthy diet consumed throughout the life-course can help in prevention of malnutrition, i.e. both undernutrition and overnutrition. But in a developing country like India, factors like urbanization and globalization have led to a change in the composition of diets. Processed foods (food which have undergone processing to increase their shelf life) and ultra-processed foods (foods which may be ready to eat and include high amounts of fat, salt and sugar and other food additives to make them palatable) have displaced freshly available food items like fruits, vegetables, whole grains, etc. and the result is consumption of an imbalanced diet. Some of the most important nutritional problems of public health importance in India are low birth weight, undernutrition in children, chronic energy deficiency in adults, micronutrient malnutrition and diet related non-communicable diseases. Healthy eating habits should be developed early in life. Studies have shown that a child born undernourished may have an increased risk of developing diet related chronic diseases (eg. diabetes, hypertension, etc.) in later life.

Let us read in brief about the four basic food groups and the classification of foods based on their function. The first food group is cereals, millets and pulses. Cereals are the major source of energy in our diet and provide some proteins also. It is recommended to include a cereal pulse combination in every meal to enhance the protein quality. It is also advised to consume whole

grains rather than refined grains as fibre and B-vitamins are present in the outer layer. The second food group is vegetables and fruits. Fruits and vegetables of different natural colors should be included in our diet as they provide many important vitamins, minerals and fibre which help in improving our immunity. The third food group is milk and milk products, egg, meat and fish. They provide us with good quality proteins. Milk and milk products are rich sources of calcium. The fourth food group is oils & fats and nuts & oilseeds. These are energy dense and should be consumed within limits. Unsaturated fat sources should be preferred over saturated fat sources.

Food items can also be classified based on their functions. Energy rich foods are a source of carbohydrates and proteins and provide energy to perform daily activities. Whole grain cereals and millets, oils and fats, nuts and oilseeds and sugar are energy rich foods. Body building foods are a source of proteins and help build our bones and muscles. Pulses, nuts and oilseeds, milk and milk products, and meat, fish and poultry are body building foods. Protective foods provide vitamins and minerals and help in improving our immunity. Green leafy vegetables, other vegetables and fruits, eggs, milk and milk products and flesh foods are protective foods.

Diet during different life-stages: The nutrient requirements are different for every individual: infant, growing child, pregnant/lactating women, adult man or woman and elderly people. The following figure shows the importance of diet during different stages of life.

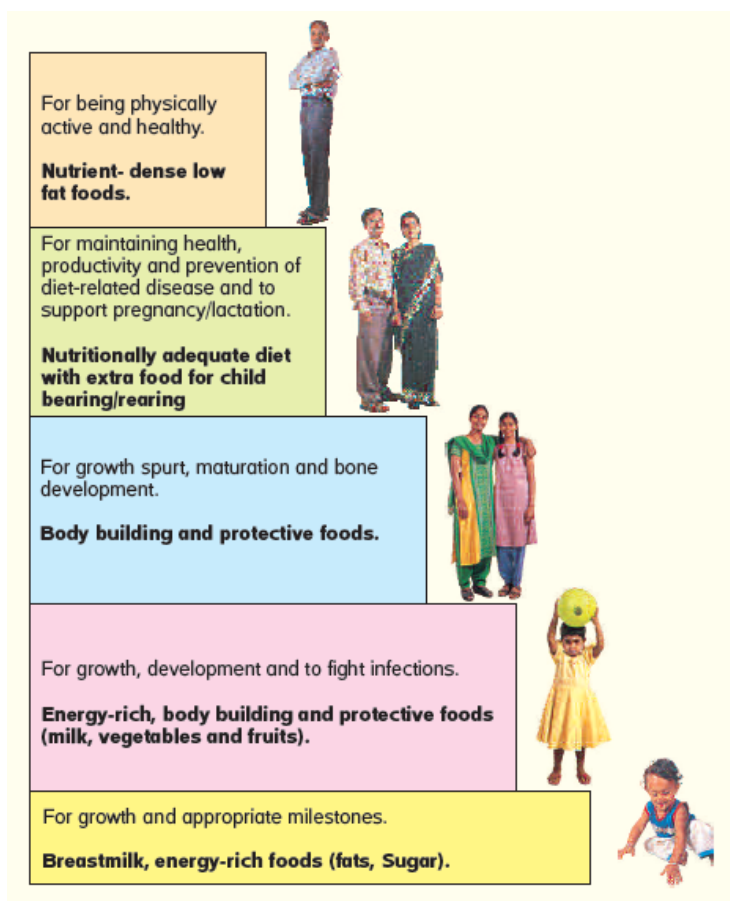


Figure 2: 2. **Importance of diet during different stages of life**
(Source: **Dietary guidelines for Indians, ICMR 2011**)

2. Importance of diet during different stages of life

2.1. Diet for an Infant: Diet is very important during the growing years of life. The World Health Organization (WHO) suggests the following:

- ✓ Infants should be breastfed exclusively during the first 6 months of life.
- ✓ Infants should be breastfed continuously until 2 years of age and beyond.
- ✓ From 6 months of age, breast milk should be complemented with a variety of adequate, safe and nutrient dense complementary foods. Salt and sugars should not be added to complementary foods.

Babies should be exclusively breastfed for the first six months of life. Breast feeding should preferably be started within an hour after delivery and first milk (colostrum) should not be discarded. Colostrum helps in protecting the baby from several infections. There is no need to give additional water to breast fed infants during the first six months of life. Complementary foods should be started after six months while continuing breastfeeding. Complementary foods can be prepared at home using cereals (wheat, rice, jowar, bajra, etc.), pulses (eg. moong dal, etc.), nuts and oilseeds (groundnut, sesame, etc.), oils (groundnut oil, sesame oil etc.), fruits (banana, etc.) and vegetables (eg. carrots, bottle gourd, etc.). The consistency, frequency and the nutritional composition of complementary foods should be age-appropriate. Complementary foods should be prepared hygienically. Avoid giving foods having high amounts of fat, salt and sugar to infants. Some examples of complementary foods are given below:



Khichdi



Mashed Banana

2.2. Diet for a Growing Child: A well balanced diet during childhood lays the foundation for a healthy and active life. Childhood is a period of growth and development. A well formulated balanced diet will boost the immunity of children and adolescents; and help them in achieving optimum growth. In addition, playing outdoors is also very important. Adolescence is a period of

increased demand and includes rapid increase in height and weight, hormonal changes and mood swings.

- ✓ Children and adolescents require good amount of carbohydrates and fats to meet the increased needs of energy. A daily intake of food items like whole grains (wheat, brown rice), nuts (eg. groundnuts, etc.), starchy vegetables like potatoes, sweet potatoes, and fruits like banana can provide them with energy. Good quality fats should also be incorporated in their diet.
- ✓ Protein is essential for growth and repair of muscles and for building antibodies. Sources of proteins like pulses, milk and milk products, eggs, lean meat like fish and chicken must be included in diet. If the child is vegetarian, then vegetarian sources of protein like pulses, milk and milk products can be consumed adequately.
- ✓ Include food items rich in calcium for development of bone mass. Examples include dairy products (milk, curd, paneer, etc.), spinach, pulses (eg. rajma), nuts (eg. groundnuts, etc.) and millets like ragi.
- ✓ A variety of different colored fruits and vegetables should be a part of the child's diet. Vitamins perform many functions in our body and boost our immunity. Vitamin A is essential in maintaining our vision and its deficiency may lead to night blindness. Sources of vitamin A are dark green leafy vegetables, yellow, orange colored vegetables like tomato, sweet potato, and fruits (such as carrots, papaya, mangoes). Vitamin D is needed for bone growth and development and for absorption of calcium. Sunlight is the main source of vitamin D. Therefore, playing outdoors in safe environment is very important. Some amounts of vitamin D can also be derived from food items like organ meat, egg yolks, etc.
- ✓ Adolescent girls may need more iron than boys with the onset of menstruation. Food items rich in iron (e.g. green leafy vegetables, legumes and dry fruits and meat, fish and poultry products) and vitamin C (e.g. guava, citrus fruits like oranges, etc.) should be consumed frequently. Avoid drinking tea/ coffee with and two hours before or after the meal.



- ✓ Children should be discouraged to consume ultra-processed foods having high amounts of fat, salt and sugar as these may lead to development of various long-term health complications, such as obesity, heart disease, type 2 diabetes, hypertension, etc.
- ✓ Bad habits like smoking, chewing tobacco or drinking alcohol should be discouraged
- ✓ Involvement in outdoor games should be encouraged as it will increase their strength and stamina. At the same time, screen time should be minimized.
- ✓ Children should be taught good practices like washing hands after using the washroom, washing hands before meals, brushing teeth twice a day, etc.
- ✓ Drink enough water every day. Prefer beverages like buttermilk, plainlassi, coconut water, etc. over soft drinks and other sugar-sweetened beverages.



2.3. Diet for Pregnant and Lactating Mother: The nutrient requirements of pregnant and lactating mothers are higher. Pregnant women need extra food to meet the nutritional requirement of the baby in the womb. The nutritional requirements of a pregnant woman will vary with each trimester. Pregnant woman should also consume nutritional supplements (iron and folic acid) based on the doctor's advice. Lactating women need extra food as they have to breastfeed their baby. Lactating women may also consume nutritional supplements.

- ✓ Intake of additional calcium during pregnancy and lactation will help in proper formation of bones and teeth of the baby, secretion of breast-milk after delivery, and prevent osteoporosis in the expecting and lactating mothers. Calcium rich foods include milk and milk products, green leafy vegetables, legumes, etc.
- ✓ Vitamin A rich foods like dark green leafy vegetables, colored fruits and vegetables are also required during lactation. Apart from these, food items rich in Vitamin B₁₂ (eg. non-vegetarian food items) and Vitamin C (amla, guava, oranges, etc.) should also be consumed.
- ✓ Iron rich foods green leafy vegetables, legumes, nuts and non-vegetarian sources like meat, fish and poultry products should also be consumed. If the individual is vegetarian, iron can be derived from vegetarian sources only. Vitamin C rich food items like amla, guava, oranges and other citrus fruits can help in better absorption of iron from diet.
- ✓ Iodized salt should be consumed within prescribed limits (to be discussed later) should be consumed to reduce the risk of still births, abortions and cretinism.
- ✓ Alcohol and tobacco should not be consumed during this period as it is harmful for the health of mother as well as child.
- ✓ Sprouted pulses (eg. green gram, bengal gram, etc.) and fermented foods (eg. idli, dosa, etc.) can also be consumed as they are healthy.





2.4. Diet for an Adult Male & Female: According to WHO, a healthy diet for adults should contain:

- ✓ Fruits, vegetables, legumes (eg. lentils, beans), nuts and whole grains (e.g. unpolished wheat, millets, brown rice, oats, etc).
- ✓ At least 400 grams of fruits and vegetables a day. Potatoes, sweet potatoes and other starchy roots are not included in fruits or vegetables.
- ✓ Less than 10% of total energy intake from free sugars (i.e. around 12 level teaspoons) but ideally less than 5% of total energy intake for additional health benefits. Free sugars are mostly added to foods or drinks by the manufacturer, cook or consumer. They are also found in sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.
- ✓ Less than one-third of total energy intake from fats. Unsaturated fats (e.g. found in fish, nuts, sunflower, etc.) are preferable to saturated fats (e.g. found in fatty meat, butter, coconut oil, cream, ghee, etc.). Trans fats (found in processed food, fast food, fried food, cookies, margarines and spreads) are not part of a healthy diet.
- ✓ Less than 5 gram of iodized salt (equivalent to approximately 1 teaspoon).

Adults should make sure that they include some form of physical activity in their routine so that they don't remain sedentary. High intake of salt and its sources (eg. pickles, papads, etc.) might lead to high blood pressure. Adult females should include more calcium as well as iron rich food sources in their diet.

2.5. Diet for Elderly: Individuals above 60 years are known as elderly. Elderly people should consume a nutrient rich diet which enables them to be fit and active.

- ✓ Elderly people require lesser calories as their lean muscle mass and physical activity decreases with age. They need more calcium, iron, zinc, vitamin A and antioxidants to prevent age-related degenerative diseases and for increasing their life expectancy.

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- ✓ Exercise should form an important part of their routine as helps in maintain their body weight and flexibility in joints. Daily walks should be included in their routine.
 - ✓ Calcium rich foods like low fat dairy products, toned milk and green leafy vegetables should be included in the daily diet to maintain bone health, and prevent osteoporosis and bone fractures.
 - ✓ Protein rich foods like pulses, toned milk, etc. should also be consumed in adequate amounts.
 - ✓ Intake of saturated fats, sweets, oily food, salt and sugar should be reduced.
 - ✓ They may face problems like loss of appetite or difficulty in chewing. A soft diet should be given to elders, with inclusion of fruits and vegetables in their diet.
 - ✓ Smoking, chewing of tobacco and tobacco products (Khaini, Zarda, Paan masala) and consumption of alcohol should be avoided.

The diet for elderly people should be well cooked, soft and should contain less salt and spices. They should eat small quantities of food at frequent intervals. They should make sure adequate amounts of water are consumed to avoid dehydration and constipation. A doctor must be consulted in case of any medical condition. Stress management techniques like yoga and Meditation should be adopted to achieve a healthy lifestyle.

3. EXAMPLES OF A BALANCED DIET

Some examples of a meal consumed at lunch or dinner time are shown below:



In the above picture, we can see that the plate constitutes chapati (energy giving food), seasonal vegetable (protective food), pulse (body building) and curd (body building). This meal is rich in protein as there are two protein sources included. We can also add salad to this meal which will

further enhance the nutrient content of this meal. A fruit can also be added.



The plate shown in the picture above contains chapatti (energy giving food), seasonal vegetable (protective food), pulse (body-building food) and curd (body-building food). In addition, salad is also there, which is a protective food.

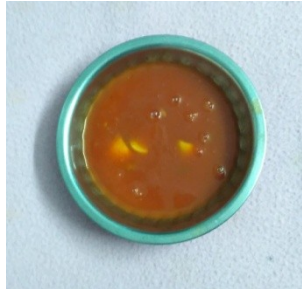


In the plate above, we can see that chapatti has been replaced by rice (energy giving food). Peas (protective food) have been added to the rice to increase the nutrient content. Curd (body building food) is served along with it.

Thus, the main meals should ideally include food items from cereal groups (roti/ rice/ etc.). These energy giving foods should constitute almost one-fourth of the plate. Seasonal vegetables (vegetables/ green leafy vegetables) and fruits should constitute half of the plate. The rest one-fourth of the plate should be some protein source like pulses, egg, fish, poultry or meat. In addition, a dairy item (eg. curd) should also be consumed.

Some examples of snacks which can also be consumed in between two main meals are as follows:

Vegetable soup and seasonal fruits are healthy snack options. Soup can be prepared at home with available seasonal vegetables.



IMPORTANT POINTS TO REMEMBER

- Eat plenty of vegetables and fruits every day. They provide various vitamins and minerals. Fruits and vegetables which are in season are fresh, nutritious, affordable and easily available.
- Include sources of proteins in your diet. Eggs, lean meat like chicken and fish, pulses (eg. Bengal gram dal, green gram dal, black gram dal, etc.), legumes, milk and milk products (eg. curd, paneer, etc.) are rich sources of protein. Consuming at least one protein source in our meal can keep us full for longer and reduce overeating.
- While preparing food at home, choose unsaturated fat (eg. refined oils like mustard, soyabean, sunflower, groundnut, etc.) over saturated fat (ghee, butter, etc). Intake of cholesterol rich sources (eg. meat, ghee, etc.) should also be minimized. Bakery items may contain sources of trans fats and their intake should also be minimized.
- A normal healthy person should drink about 8 glasses (2 litre) of water per day.
- Consume at least 250 ml of boiled or pasteurized milk per day (Can go up to 500 ml for children).
- Avoid overeating. Take control of your portion sizes, chew slowly and eat at home with family (when possible). These factors lead to development of healthy eating practices among children, thus promoting good health.
- School children and individuals who are working should make it a habit to carry lunch from home. Home-cooked food is hygienically prepared, fresh and healthy. Food items available from street vendors, canteens, dhabas, other food outlets, etc. usually contain high amounts of fat, salt, sugar and refined carbohydrates.
- Ultra processed foods have become a part of our life inevitably. These are available everywhere, are affordable, convenient and are favored, especially by nuclear families. These may be packaged (eg. biscuits, chips, namkeen, soft drinks, chocolates, pickles, ketchup, etc.) or fresh (eg. samosa, kachori, tikki, other traditional Indian sweets and snacks, etc.). Efforts should be made to reduce the amount and frequency of their consumption as these food items contain unhealthy ingredients. These unhealthy ingredients are high amounts of fat, salt, sugar. These are energy dense and may contain poor quality fats (eg. margarine, vanaspati, etc.).
- It is recommended to carry out at least 45 minutes of physical activity of moderate-intensity (eg. brisk walking, dancing, bicycling, walking short distances for fetching milk and vegetables,

yogasanas and pranayama, etc.)for at least 5 days in a week.

- Refer to the food pyramid. It provides an idea about the food items which should be consumed adequately, liberally, moderately and sparingly.
- Consumers should read food labels before purchasing packaged food items. Keep an eye for ingredients like fat, salt and sugar in high amounts and use of too many preservatives.
- Individuals suffering from conditions which need dietary modifications should take advice from a trained professional, i.e. dietician/ nutritionist. For eg. A diabetic may need guidance to understand the amount of roti or rice which should be eaten in one meal.