

1. Details of Module and its structure

Module Detail	
Subject Name	Food, Nutrition for Healthy Living
Course Name	Food, Nutrition for Healthy Living
Module Name/Title	Balance diet - I
Module Id	FNHL_10107
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

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1. Introduction

There is a set of dietary guidelines formulated for the Indian population. These guidelines focus on consumption of adequate amounts of food items from different food groups. The guidelines also highlight the dietary requirements of vulnerable age groups. The concept of food pyramid helps us to find out how much of which food item is healthy to be consumed. The need for dietary diversity, i.e. intake of a variety of food items on a regular basis has also been included here. Our body requires various nutrients in different amounts and proportions to perform all its functions. These nutrients can be derived if we consume a variety of food items in adequate amounts. The required amount in which a food should be eaten to derive a particular nutrient is the concept behind setting up recommended dietary allowances (RDA) for various nutrients. The RDAs are the levels of intake of nutrients which should be consumed every day to meet the requirements of most of the individuals in a given population. The RDAs are not the actual requirement and include a margin of safety. Factors like age, sex, body weight, level of physical activity and physiological status affect the RDA levels. It is important to note that RDAs are general guiding principles and are applicable to almost 98% of the general population. The RDAs of different nutrients can only be achieved if we consume a balanced diet. The concept of balanced diet revolves around balancing the amount of different types of foods eaten every day to achieve a nutritionally adequate diet. Consumption of a balanced diet on a daily basis will ensure that we get adequate amounts of all nutrients. This will help us in improving our immunity and maintaining an ideal body weight. Since the RDA for different age groups are different, their dietary requirements will also be different. Infants should be breastfed exclusively for the first six months. They should be given complementary foods after six months and breastfeeding should be continued till at least the first two years. The complementary foods

prepared should include a variety of fresh foods acceptable to the child. Diets of children and adolescents should be adequate in food items which provide energy, protein, Vitamin C, calcium and iron apart from other macro and micronutrients. The dietary intakes of pregnant and lactating women are increased and they need to consume food items rich in calcium, iron, vitamin A, etc. Adult men and women should make sure that they consume food items within prescribed limits. Deficiency and excess of all nutrients should be avoided. Elderly should make sure that they consume food items rich in calcium, iron, zinc, vitamin A and antioxidants. Apart from these, water in adequate amounts and physical activity is recommended for all.

Objectives: After going through this lesson, the learners will be able to understand the following:

2. Dietary guidelines for Indians

The set of the following fifteen guidelines have been formulated by National Institute of Nutrition, Indian Council of Medical Research. These dietary guidelines focus on promotion of health and prevention of diseases in all age groups by consumption of adequate amount of foods from all food groups. Vulnerable age groups like infants, children and adolescents, pregnant and lactating women and the elderly have been given special importance in our dietary guidelines,

1. Eat variety of foods to ensure a balanced diet.
2. Ensure provision of extra food and healthcare to pregnant and lactating women.
3. Promote exclusive breastfeeding for six months and encourage breastfeeding till two years or as long as one can.
4. Feed home based semi solid foods to the infant after six months.
5. Ensure adequate and appropriate diets for children and adolescents, both in health and sickness.
6. Eat plenty of vegetables and fruits.
7. Ensure moderate use of edible oils and animal foods and very less use of ghee/ butter/ vanaspati.
8. Avoid overeating to prevent overweight and obesity.
9. Exercise regularly and be physically active to maintain ideal body weight.
10. Restrict salt intake to minimum.
11. Ensure the use of safe and clean foods.
12. Adopt right pre-cooking processes and appropriate cooking methods.

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13. Drink plenty of water and take beverages in moderation.
 14. Minimize the use of processed foods rich in salt, sugar and fats.
 15. Include micronutrient-rich foods in the diets of elderly people to enable them to be fit and active.

3. Minimum dietary diversity

The concept of a diverse diet has gained a lot of importance. There are several indicators available which are used to assess if the diet of a particular age group is diverse or not. One such indicator is Minimum Dietary Diversity for Women aged 15-49 years. With the help of this indicator, we can assess if women have consumed at least five out of ten defined food groups the previous day or night. The ten food groups are as follows:

1. Grains, white roots and tubers, and plantains
2. Pulses (beans, peas and lentils)
3. Nuts and seeds
4. Dairy
5. Meat, poultry and fish
6. Eggs
7. Dark green leafy vegetables
8. Other vitamin A-rich fruits and vegetables
9. Other vegetables
10. Other fruits

This gives us an idea how important it is to have a variety in the diet we consume. A diverse diet which is traditional in nature will help in deriving the maximum protective effects from the foods consumed. Use of seasonal foods makes it convenient to include a variety in diet as they are easily available, fresh & tasty and affordable.

Food Pyramid

We need an adequate diet which provides all the nutrients throughout our life to stay healthy. The Food Pyramid can help us decide the same. Cereals, millets, pulses and milk are major sources of most nutrients and these should be consumed **adequately**. Milk provides good quality proteins and calcium and must be an essential item of the diet, particularly for children. Vegetables and fruits provide protective substances such as vitamins/ minerals/ phytonutrients and should be

consumed **liberally**. One must consume seasonally available and different colored fresh fruits and vegetables. Oils and nuts are calorie-dense, and are useful for increasing the energy density and quality of food. Meat and meat products provide good quality protein and iron.

Oils and meat and meat products should be consumed **moderately**. However, if the person is a vegetarian, he/ she can get most of the nutrients from a right combination of cereals, pulses, vegetables, fruits and milk. Lastly, as described in the last section, food items like burger, french fries, ice-cream, colas, chocolates, i.e. HFSS foods should be consumed **sparingly**. Bakery items are also included in this category.



Figure 1:Food Pyramid

(Source: **Dietary guidelines for Indians, ICMR 2011**)

4. Recommended dietary allowances

As you have already studied in the previous chapters, our body needs many nutrients to lead a healthy and active life. These nutrients perform all the bodily functions which are necessary to keep us healthy and active. Proper intake of food or consumption of a balanced diet in relation to the body's dietary needs is needed for providing these nutrients. One can consume a balanced diet if one chooses the right type of food items from each food group in adequate amounts. But, first we need to gain knowledge about the amount of nutrients needed by individuals of different age groups.

Recommended Dietary Allowances (RDA) are the levels of intake of nutrients which should be consumed every day to meet the requirements of most of the individuals in a given population. These are general guiding principles of nutrient intakes and dietary allowances. These levels are considered to be adequate to meet the nutrient needs of healthy people in a population. These are applicable to majority (97-98%) of the population. The RDA do not cover problems like premature birth, any metabolic disorders, infections, chronic diseases, conditions requiring

special dietary and therapeutic measures, etc. RDAs are formulated on the basis of scientific judgment by experts in the area. RDAs represent the limits of nutrients needed for maintenance of good health. They can further be used to evaluate the adequacy of diets being consumed by people.

“The average daily dietary nutrient intake level sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) healthy individuals in a particular life stage and gender group”

Criteria for setting RDAs: The concept of RDA is based on the fact that individuals of similar age, sex and physical activity levels may have difference nutrient needs. The nutrient requirements may further be affected by genetic and environmental factors. Therefore, in order to ensure that adequate intake of all nutrients, a higher limit of all nutrients is set. RDAs are decided on the basis of the following:

- The amount of nutrient needed to perform the required functions in the body;
- The extent of utilization of that nutrient by the individual;
- Variations in the requirements of nutrients among individuals; and
- Bioavailability among the food sources of the nutrient (eg. Iron from non-vegetarian sources like meat is better absorbed than vegetarian sources of iron like green leafy vegetables; loss of vitamin C during cooking, etc.).



A safety factor is considered while deciding the RDA for all nutrients except for energy. Thus, RDAs provide safe and adequate levels of nutrients needed by different age groups. A diet composed of a variety of foods from diverse food groups will be adequate in meeting the RDA for all nutrients.

Factors affecting RDA: The requirement for a particular nutrient for each individual depends on his/ her:

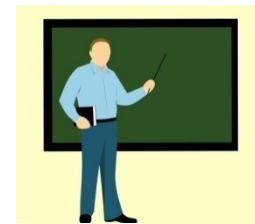
- **Age:** The requirements of nutrients of a child aged 4 years, an adult aged 35 years or an elderly aged 65 years are all different.



- **Sex:** Dietary requirements may vary depending the sex of the individual, i.e. male or female. Eg. The iron requirement of adolescent girls is more than the iron requirement of adolescent boys as iron is lost during menstruation every month.
- **Body weight:** An adult man who is tall and has a heavy built may need more nutrients than an adult man of short height.



- **Level of physical work:**The RDA may vary depending on the level of activity of an individual. Teachers, office clerks, etc. are considered as sedentary workers. Housewives who are involved in all the household work, postman, gardener, etc. are considered as moderate workers. Rikshaw pullers, coolies, sports persons, etc. are considered as heavy workers. A heavy worker's dietary requirements will be more in comparison to a moderate or sedentary worker.



- **Physiological status:** A pregnant woman will need more nutrients to support the growth of her baby; and a lactating woman will also need more nutrients so that she can feed her child.



There are general guidelines which decide the nutrient requirements and the dietary allowances for various groups. The requirements for an individual are different from the requirements of a group. As discussed above, the nutrient requirements for an individual will depend upon the age, body weight and physiological status; whereas the requirements for a group take into account factors like individual variations within the group, quality of the diet, effect of cooking and processing and bioavailability of the nutrient from the diet. The RDA for Indians for macronutrients and minerals has been tabulated below. RDA for micronutrients is also available. The RDA for Indians has been formulated by NIN, ICMR.

Group	Particulars	Body weight (kg)	Net Energy (Kcal/d)	Protein (g/d)	Visible Fat (g/day)	Calcium (mg/d)	Iron (mg/d)	Vitamin A (retinol) μ g/d
Man	Sedentary work	60	2320	60	25	600	17	600
	Moderate work		2730		30			
	Heavy work		3490		40			
Women	Sedentary work		1900		20	600	21	

	Moderate work	55	2230	55	25	1200	35	600	
	Heavy work		2850		30				
	Pregnant woman		+350	+23	30			800	
	Lactation 0-6 months		+600	+19	30			21	950
	6-12 months		+520	+13	30				
Infants	0-6 months	5.4	92 Kcal/kg/d	1.16 g/kg/d	-	500	46 µg/ 5 kg/day	-	
	6-12 months	8.4	80 Kcal/kg/d	1.69 g/kg/d	19		5	350	
Children	1-3 years	12.9	1060	16.7	27	600	09	400	
	4-6 years	18	1350	20.1	25		13		
	7-9 years	25.1	1690	29.5	30		16	600	
Boys	10-12 years	34.3	2190	39.9	35	800	21	600	
Girls	10-12 years	35.0	2010	40.4	35	800	27		
Boys	13-15 years	47.6	2750	54.3	45	800	32		
Girls	13-15 years	46.6	2330	51.9	40	800	27		
Boys	16-17 years	55.4	3020	61.5	50	800	28		
Girls	16-17 years	52.1	2440	55.5	35	800	26		

RDAs indicate the level of nutrients required to lead a healthy life. RDAs are technical in nature and may not be comprehended easily by a common man. For eg. A mother of a preschooler might want to know if her child can eat a small packet of chips every day; a middle-aged corporate employee would want to know how many calories should be consumed in a day to lose weight; a 50 year old diabetic women may want to know the food items that she can consume freely; etc. Individuals of different age groups may have many other doubts related to their diet. A basic knowledge about the right kind of foods can solve most of the doubts of individuals of all age groups. Furthermore, one can always refer to a dietician/ nutritionist for further clarity on their diet or for a therapeutic diet.

5. Balanced diet

It is always recommended to consume a balanced diet on a daily basis for a healthy living. Individuals of all age groups are recommended to consume a balanced diet or eat healthy along with regular physical activity. Poor nutrition can lead to compromised immunity, increased susceptibility to infections, impaired physical and mental development, and reduced productivity. The concept of balanced diet revolves around balancing the amount of different

types of foods eaten every day to achieve a nutritionally adequate diet. So let us find out more about what constitutes a balanced diet.

“A balanced diet provides all the nutrients in required amounts and proper proportions”. Balanced diet can be achieved by carefully selecting and combining food items from different food groups (to be discussed in the next sections). The amount of food needed to meet the daily dietary requirements will differ according to age, gender, physiological status and level of physical activity. A balanced diet should have a variety of foods in moderation and proper proportions.

“A balanced diet should provide around 50-60% of total calories from carbohydrates, preferably from complex carbohydrates, about 10-15% from proteins and 20-30% from both visible and invisible fat”

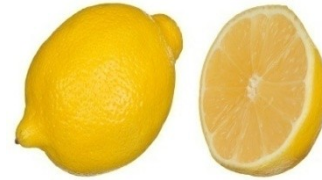
In addition, a balanced diet should also provide the following for added health benefits:

- Dietary fibre: Dietary fibre helps in retaining proper bowel function, reducing constipation, and is important in dietary management of coronary heart diseases, diabetes, obesity, cancer, etc. Sources of dietary fibre are whole grain cereals, husked pulses, fruits and vegetables.



- Antioxidants: Antioxidants give protection from many diseases. Antioxidants prevent the damage that can be caused to the cell and its components by reactive oxygen free radicals. Diseases like atherosclerosis, cancer, joint diseases, asthma, diabetes, etc. are caused by free radical reactions. Antioxidants include vitamins C and E, beta-carotene, riboflavin and selenium. Sources of antioxidants are:
 - ✓ Spices like turmeric, ginger, garlic, cumin and cloves are rich in antioxidants.

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- ✓ Raw and fresh vegetables like green leafy vegetables, carrots, fresh fruits including citrus and tomatoes.



Phytochemicals: These are chemical compounds found in fruits and vegetables. Various studies have found that phytochemicals have a beneficial effect on health. Phytochemicals like polyphenols, flavones, etc. delay ageing and help in prevention of diseases like cataract, cardio-vascular diseases, diabetes and cancer. Some of the groups of phytochemicals are listed below:

- ✓ Terpenoids- Found in citrus fruits, etc.
- ✓ Carotenoids- Sources include yellow, orange or red colored fruits and vegetables.
- ✓ Saponins- They have anti-inflammatory and anti-allergic properties. They are also known to reduce cholesterol levels, and may be beneficial in some cancers. Sources include legumes (chickpea, soybean, peanuts, etc.) and herbs and spices (fenugreek, nutmeg, etc.)
- ✓ Polyphenols- They have many health benefits, including antioxidants benefits. They also protect against cardiovascular diseases. Sources include grapes, buckwheat, citrus fruits, chillies, oats, berries, brinjal, wheat, pineapple, turmeric, tea, green tea, flax seeds, pumpkin seeds, sunflower seeds, etc.



Balanced diet should also include adequate amount of water and exercise. Exercise is not a part of diet that we eat, but holds a lot of importance in maintaining good health.

We must appreciate the value of good health and the role balanced diet plays in its maintenance. Balanced diet is not easy to achieve. We should make efforts to consume a balanced diet even if we have a hectic lifestyle. These days, the areas around our homes or workplaces are budding with many food joints and offer a great variety of food items high in fat, salt and sugar. Furthermore, consuming a balanced diet is also dependent on factors like availability and affordability of different food items. Daily consumption of green leafy vegetables may not be possible throughout the year; so other vegetables should replace them. Affordability also acts a barrier as a daily wage earner may not be able to provide a variety of food items to his family every day. Careful planning can help in incorporating a balanced diet in our lives. However, one must possess the knowledge regarding the food items which are considered healthy and those food items which are unhealthy. Knowledge about the constituents of a balanced diet will help:



- People with a small budget to choose food items which are fresh, in season, easily available and affordable.
- People in charge of cooking food at home, eg. House wives can prepare a variety of meals which are nutritious as well as acceptable to everyone at home.
- People who ‘eat out’ frequently to choose dishes wisely so that they don’t exceed the limit for certain nutrients.

Benefits of a balanced diet:

- Choosing a balanced, adequate and a diverse diet will help in achieving a happy and healthy lifestyle.
- Vitamins and minerals present in food items help in improving our immunity
- Diet consisting of food items rich in antioxidants, phytochemicals, etc. can protect us from many disorders like obesity, diabetes, cardiovascular diseases, some types of cancer, skeletal conditions, etc.
- Healthy diets also help in maintaining an ideal body weight.
- Healthy eating is not boring. Many types of palatable and colorful dishes can be prepared from a variety of foods and different ways of cooking them.

Along with consumption of a balanced diet, people should be motivated to remain physically active and reduce screen time, i.e. time spent sitting in front of television, computer, laptop or a smartphone.