

RECOMMENDED DIETARY ALLOWANCES AND MEAL PLANNING

CHAPTER

1

OBJECTIVES

At the end of this lesson, the student will be able to

- Know the various factors which influence our RDA and the difference between requirement and RDA
- Define the term balanced diet and understand the importance of consuming a balanced diet
- Discuss the use of food groups and RDA in planning balanced diets
- Understand the principles and aims of meal planning
- Identify the factors that need to be considered while planning meals
- Learn the steps involved in meal planning
- Understand the concept of food exchanges in meal planning
- Learn different ways of reducing the cost of a meal without affecting its quality



Nutrients are needed by humans in specific amounts to ensure good health and well being. These nutrient needs are met by eating the right kinds and amounts of food. While planning

balanced diets, we need certain guidelines regarding the kinds and amounts of nutrients that we require for maintenance of good health.

Each day our body needs a supply of a number of nutrients to carry out its activities efficiently. Based on research the amounts and kinds of nutrients needed for good health have been determined.

1.1 RECOMMENDED DIETARY ALLOWANCES

Recommended Dietary Allowances (RDA) are estimates of intakes of nutrients which individuals in a population group need to consume to ensure that the physiological needs of all subjects in that population are met.



The recommended dietary allowance (RDA) is the guideline stating the amount of nutrients to be actually consumed in order to meet the requirements of the body.

Evolution of Recommended Dietary Allowances (Indian Council of Medical Research- ICMR For Indian Population)

- ❖ Following the recommendations of the League of Nations in 1937, an attempt to recommend dietary allowances for energy, protein, iron, calcium, vitamin A, thiamine, ascorbic acid and vitamin D for Indians was made in 1944 by the Nutrition Advisory Committee of the Indian Research Fund Association, now called Indian Council of Medical Research (ICMR).
- ❖ Between 1950 and 1968, in the wake of recommendations for energy and protein requirements by the Food and Agricultural Organization (FAO) and based on the international data provided by the FAO/WHO expert groups and those available in India, the recommendations for dietary requirements were revised.
- ❖ A few years later, a newer set of data were generated by various researches and surveys conducted by renowned institutions like Avinashilingam Institute for Home Science and Higher Education for Women – Deemed University, Coimbatore, National Institute of Nutrition, Hyderabad.
- ❖ ICMR and National Nutrition Monitoring Bureau (NNMB), created a necessity to revise RDAs further. In 1988 an expert committee constituted by ICMR modified the reference body weight for Indian adults and RDAs in respect of energy fat, vitamin D and vitamin A. Recommendations on the safe intake of fat in terms of both visible and invisible

dietary fats were made. For the first time, recommendations for certain trace elements, electrolytes (sodium and potassium), magnesium and phosphorus, vitamin K and vitamin E and dietary fibre were considered.

A number of approaches such as

- Dietary intake of nutrients
 - Growth
 - Nutrient balance
 - Minimal loss of nutrients and
 - Nutrient turnover
- were utilized in arriving at the RDAs.

Difference between Requirement and Recommended Dietary Allowances

The requirement for a particular nutrient is the minimum level that needs to be consumed to perform specific functions in the body and to prevent deficiency symptoms. It should also maintain satisfactory stores of the nutrients in the body.

Requirements are the quantities of nutrients that healthy individuals must obtain from food to meet their physiological needs. The recommended dietary allowances (RDA) are estimates of nutrients to be consumed daily to ensure the requirements of all individuals in a given population. The recommended level depends upon the bioavailability of nutrients from a given diet. The term bioavailability indicates what is absorbed and utilized by the body. In addition, RDA includes a margin of safety, to cover variation between individuals, dietary traditions and practices

Recommended Dietary Allowances = Requirement + Margin of safety

The margin of safety is added to take care of factors such as

1. Losses during cooking and processing
2. Short periods of deficient intake



3. Nature of the diet

4. Individual variations in requirements

The requirement for vitamin C or ascorbic acid is actually 20 mg/day, but since the vitamin is easily destroyed during pre-preparation, cooking and storage, the recommended intake is twice the requirement and is 40 mg/day

1.1.1 Factors influencing RDA

The RDAs apply to healthy individuals and are set high enough to cover individual variation. Recommended dietary allowances of an individual depend on many factors like

1. **Age** - Adults require more total calories than a child, whereas a growing child requires more calories per kg of body weight than an adult.
2. **Sex** - Males with high Basal Metabolic Rate (BMR) require more calories than females.
3. **Physical activity**– The type of activity also determines the energy requirements. Based on the nature of work and level of activity different occupations are classified into three categories:
 - Sedentary
 - Moderate
 - Heavy

Sedentary (light work): A sedentary person is one who does most of the -work sitting at one place using only his hands and head. A few examples of individuals undertaking sedentary work include teachers, tailors, typists, clerks, office executives, housewives who have household help.

Moderate (neither too light nor too strenuous hard work): A person is said to be a moderately active individual if his/her work involves the use of both hands and feet continuously but not very strenuously. A few examples of people

who would belong to this group would include postmen, housemaids, servants, fishermen, agricultural labourers, housewives who do most of the housework themselves manually.

Heavy (hard, strenuous work): A person is a heavy worker if he/she is involved in hard/strenuous work using hands and feet very fast and continuously for a long period each day. Rickshaw pullers, stone cutters, mine workers, coolies belong to this group.

4. Physiological state : Nutrient requirements are increased in conditions of physiological stress such as pregnancy and lactation.

5. Disease and drugs : Drugs prescribed for treatment can alter the requirement of one or more nutrients.

1.1.2 Recommended dietary intakes for adults



Age : 18 - 29 years

Weight : 60 kg



Age : 18 - 29 years

Weight : 55 kg

Fig.1.1 Reference man and Woman

Recommended dietary intakes for adults are based on age, sex, body size and activity level. In the case of adults, there are substantial variations in RDA particularly for energy and protein depending on the age, body weight, and activity pattern. That is why RDAs have worked out on the basis of a “**Reference individual**”. The **Reference man** is an **Indian man** in the age

Table no 1.1. RECOMMENDED DIETARY ALLOWANCES FOR INDIAN 2010

| Group | Particulars | Body wt kg | Net Energy Kcal | Protein g/d | Fat g/d | Calcium mg/d | Iron mg/d | Vitamin A | | Thiamin mg/d | Riboflavin mg/d | Niacin mg/d | Pyridoxine mg/d | Ascorbic acid mg/d | Folic acid mg/d | Vit B12 mg/d |
|-----------|----------------|------------|-----------------|-------------|---------|--------------|-----------|--------------|-----------------|--------------|-----------------|-------------|-----------------|--------------------|-----------------|--------------|
| | | | | | | | | Retinol µg/d | B-carotene µg/d | | | | | | | |
| Man | Sedentary work | 60 | 2320 | 60 | 25 | 600 | 17 | 600 | 4800 | 1.2 | 1.4 | 16 | 2.0 | 40 | 200 | 1 |
| | Moderate work | | 2730 | | 30 | | | | | 1.4 | 1.6 | 18 | | | | |
| | Heavy work | | 3490 | | 40 | | | | | 1.7 | 2.1 | 21 | | | | |
| Women | Sedentary work | 55 | 1900 | 55 | 20 | 600 | 21 | 600 | 4800 | 1.0 | 1.1 | 12 | 2.0 | 40 | 200 | 1 |
| | Moderate work | | 2230 | | 25 | | | | | 1.1 | 1.3 | 14 | | | | |
| | Heavy work | | 2850 | | 30 | | | | | 1.4 | 1.7 | 16 | | | | |
| Lactation | Pregnant Woman | 55 | +350 | +23 | 30 | 1200 | 35 | 800 | 6400 | +0.2 | +0.3 | +2 | 2.5 | 60 | 500 | 1.2 |
| | 0-6 months | | +600 | +19 | 30 | 1200 | 21 | 950 | 7600 | +0.3 | +0.4 | +4 | 2.5 | 80 | 300 | 1.5 |
| | 6-12 months | | +520 | +13 | 30 | | | | | +0.2 | +0.3 | +3 | 2.5 | | | |
| Infants | 0-6 months | 5.4 | 92/kg | 1.16 g/kg | - | 500 | 46 µg/kg | 350 | 2800 | 0.2 | 0.3 | 710 µg/kg | 0.1 | 25 | 25 | 0.2 |
| | 6-12 months | 8.4 | 80/kg | 1.69 g/kg | 19 | | 5 | | | 0.3 | 0.4 | 650 µg/kg | 0.4 | | | |
| Children | 1-3 years | 12.9 | 1060 | 16.7 | 27 | 600 | 9 | 400 | 3200 | 0.5 | 0.6 | 8 | 0.9 | 40 | 80 | 0.2-1.0 |
| | 4-6 years | 18.0 | 1350 | 20.1 | 25 | | 13 | 400 | 3200 | 0.7 | 0.8 | 11 | | | 100 | |
| | 7-9 years | 25.1 | 1690 | 29.5 | 30 | | 16 | 600 | 4800 | 0.8 | 1.0 | 13 | 1.6 | | 120 | |
| Boys | 10-12 years | 34.3 | 2190 | 39.9 | 35 | 800 | 21 | 600 | 4800 | 1.1 | 1.3 | 15 | 1.6 | 40 | 140 | 0.2-1.0 |
| Girls | 10-12 years | 35 | 2010 | 40.4 | 35 | | 27 | | | 1.0 | 1.2 | 13 | 1.6 | | | |
| Boys | 13-15 years | 47.6 | 2750 | 54.3 | 45 | 800 | 32 | 600 | 4800 | 1.4 | 1.6 | 16 | 2.0 | 40 | 150 | 0.2-1.0 |
| Girls | 13-15 years | 46.6 | 2330 | 51.9 | 40 | | 27 | | | 1.2 | 1.4 | 14 | | | | |
| Boys | 16-17 years | 55.4 | 3020 | 61.5 | 50 | 800 | 28 | 600 | 4800 | 1.5 | 1.8 | 17 | 2.0 | 40 | 200 | 0.2-1.0 |
| Girls | 16-17 years | 52.1 | 2440 | 55.5 | 35 | | 26 | | | 1.0 | 1.2 | 14 | | | | |

Source: Dietary Guidelines for Indians - A Manual by Kamala Krishnaswamy, B. Sesikeran (Second Edition 2011), NIN, ICMR

group of **18-29** years doing **moderate work** and weighing **60 kg**. Similarly, an **Indian woman 18-29** years old doing **moderate work** and weighing **55kg** is referred to as the Reference woman.

The RDA is based on scientific knowledge and prepared by the National Nutritional Advisory Committee (ICMR). The Committee revises the RDA every 10 years. The current RDA for Indians was set up in 2010. The recommended dietary allowances for Indians (2010) is given in table 1.1

1.2 BALANCED DIET

A “**Balanced Diet**” can be defined as **one which contains different types of foods in such quantities and proportions that the need for calories, minerals, vitamins, and other nutrients is adequately met and a small provision is made for extra nutrients to, withstand short durations of leanness.**

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

In addition, a balanced diet should provide bioactive phytochemicals such as dietary fibre, antioxidants and other nutraceuticals which have positive health benefits.

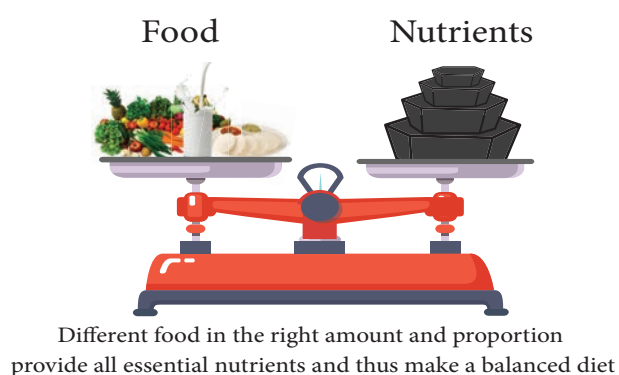


Fig. 1.2 Balanced diet

Balanced Diet enhances the quality of life as it:

- ❖ meets nutritional requirement
- ❖ prevents degenerative diseases
- ❖ improves longevity
- ❖ prolongs productive life
- ❖ improves immunity
- ❖ increases endurance level
- ❖ develops cognitive ability
- ❖ helps in coping up with stress

Points to be considered in planning a balanced diet

- ❖ Calorie allowances can be ± 50 , while for all other nutrients minimum RDA must be met.
- ❖ Energy from cereals should not be more than 75 percent.
- ❖ Include two cereals in one meal e.g. rice and wheat.
- ❖ To improve protein quality the ratio of cereal protein to pulse protein should be 4:1.
- ❖ Two to three serving of pulses should be taken a day.
- ❖ Include at least one medium size fruit. The fruit can be given raw without much cooking.
- ❖ Five servings of fruits and vegetables should be included in a day
- ❖ The diet should include minimum 100ml milk per day.
- ❖ Foods rich in fibre should be included.
- ❖ One-third of the nutritional requirements, at least calorie and protein should be met by lunch and dinner.



Fig no 1.3 Food Guide for planning a balanced diet

In order to plan balanced meals for people, the foods we use in our daily meals are classified into four basic food groups: on the basis of the major nutrients present. The food groups are chosen because of the specific nutrients contributed by each to the total diet. This practical tool devised to guide food selection to meet nutritional needs is termed '**Food Guide**'.

A food guide is a practical tool in meal planning and evaluation

It's a guide that helps us to make healthy food choices

It tells us all the food groups our bodies need and how many servings of each group we need

How to plan a meal with the help of the Food Guide?

- ❖ Include foods from each of the four broad food groups
- ❖ Choose the minimum number of servings from each group
- ❖ Make choices within each group
- ❖ Include one food from the protein group in each meal
- ❖ Use seasonal foods

1.3 MEAL PLANNING

Any individual who carries the responsibility of providing meals has to take decisions regarding what to serve, how much to serve, how much to spend, where to shop, how much to buy, how to prepare food, how to serve meals and at what hour to serve the meal. All such decisions are a part of planning meals. Extending this concept further, one could define meal planning as a simple practical exercise which involves applying the knowledge of food, nutrient requirement, and individual preferences to plan adequate and acceptable meals. In other terms, **meal planning means planning for adequate nutrition.**



Meal planning means planning diets which will provide all nutrients in required amounts and proportions i.e. adequate nutrition.

As the family's well-being and health are depended on how well they are fed. It is a challenge to every meal-planner to meet it and when well done, it proves to be a satisfying and rewarding experience.

Meal planning thus is both an art and a science: **art** in the skillful blending of colors, texture, and flavor: and **science** in the wise choice of food for optimum nutrition and digestion.

1.3.1 Objectives of Meal planning

1. To satisfy the nutritional needs of the family members.

2. To keep expenditure within the family food budget.
3. To take into account the food preference of individual members.
4. Using methods of cooking to retain maximum nutrients.
5. To economize on time, fuel and energy.
6. To serve attractive and appetizing meals.

Providing a meal that would be enjoyed and accepted by one and all in the family is rather difficult. Individual preferences, varied nutrient needs, varied food habits, are a few factors that would influence meal planning. The crucial aspect to be considered then is how best to plan adequate and satisfying meals, within the socio-cultural, economic, regional and psychological framework of the individual.

The various factors influencing meal planning are illustrated in figure 1.4

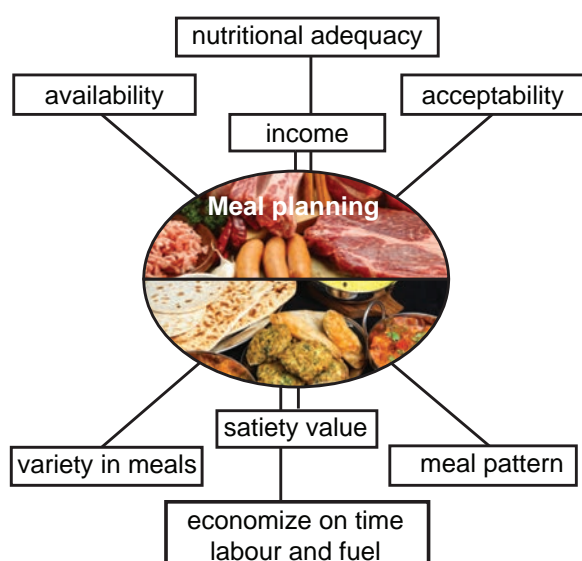


Fig. 1.4 Factors affecting Meal Planning

1.3.2 Factors affecting Meal Planning

1. Nutritional adequacy:

The nutritional requirement of the individual to be served is an important consideration in meal planning. This point is

particularly important when we are planning meals for a family. In a family, there might be different individuals - a child, an adolescent, an adult, a pregnant woman or an elderly person. Each of these individuals has his/her own specific nutrient requirements. **The basic aim while planning meals should be to fulfill the nutrient needs of each individual**

How do we ensure this? This can be ensured by planning balanced meals according to the recommended dietary intakes for different individuals. No single food can meet all the nutritional requirements. Therefore, to achieve a balance of nutrients a combination of different foods need to be included in the diet. The diet can be planned by including foods from the four food groups. Although all nutrients are important, the requirement for certain nutrients is proportionately higher in certain age groups. e.g.- Iron in an adolescent girl and a pregnant woman. Therefore identifying rich sources of various nutrients within the same food group is required. e.g.- wholecereals and rice flakes are rich in iron among cereals, milk and fish have high calcium content among animal foods.

2. Food cost and economy

The expenditure on food is an important part of a family's budget and it is influenced by

- ❖ Family size
- ❖ The number of children
- ❖ Age group
- ❖ Activity and
- ❖ Special needs of pregnancy, lactation and disease condition.

The proportionate expenditure on food depends upon the income levels i.e. it increases with a decrease in total income. Moreover, in case of low-income level, a higher proportion is spent on buying staples rather than protective foods like milk, vegetables, and fruits. Therefore the aim should be to achieve

maximum nutritional benefit at minimum cost. For example, pulses can be used as a source of protein instead of animal foods or less expensive cuts of meat can be used. For achieving economy in meal planning, the following considerations are important.

1. Knowledge of prevailing prices of food items.
2. Knowledge of proportion of edible portion of different food stuffs as they vary widely. It may be high as 100 percent in foods like milk or low as 35-40 percent in leafy vegetables. This helps to decide the quantity of food to be purchased.



Meal planning helps to ensure nutritious meals according to personal likes / dislikes

3. Buying foods from fair price shops and retail outlets.
4. Bulk purchase of non-perishables.
5. Using seasonal foods as they are not only economical but also nutritious.
6. Minimizing nutrient losses during preparation and cooking.
7. Making proper use of left over foods and the commonly discarded foods e.g. green leaves of vegetables like radish leaves.

3. Acceptability of meals

Acceptability of meals is as important as meeting nutritional needs or planning within the budget. To make meals acceptable the following considerations are important.

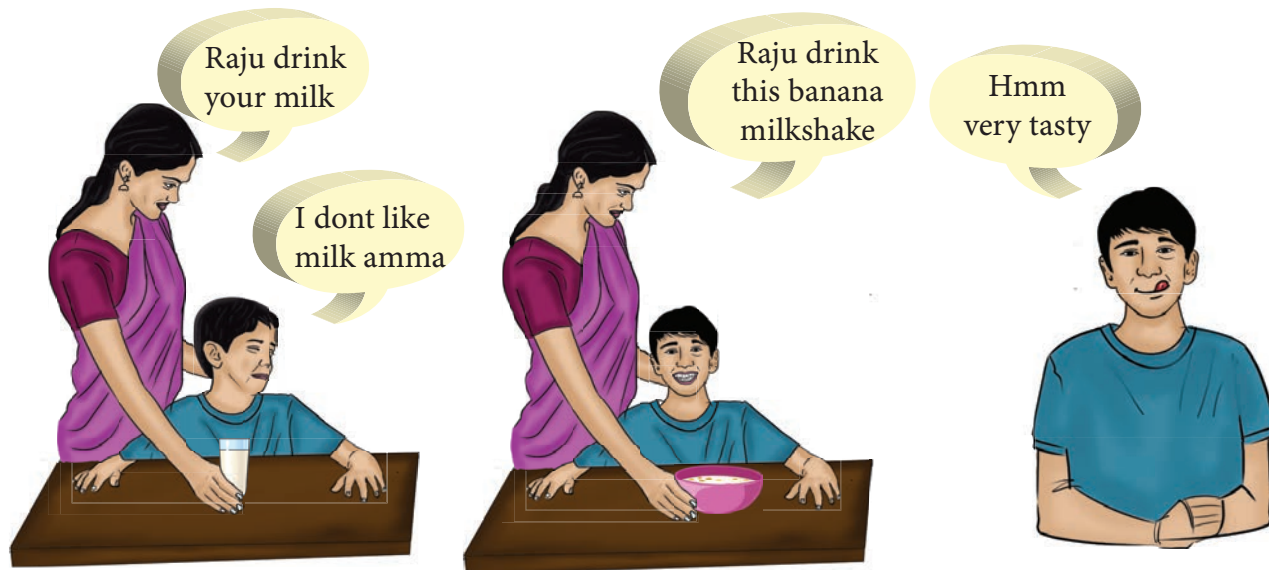
a. Likes and dislikes

The meal planned should not only meet RDA but also individual preference, particularly vegetarian or non-vegetarian preferences. The likes and dislikes of all the family members should be kept in mind. If a person does not like greens, it can be tried in a different form or substituted by some other equally nourishing food. Food habits, religion, traditions, and customs of the individual should be considered in planning the menu.

b. Variety

The meal should have variety in colour, texture, taste and flavor for better acceptability. Variety can be achieved by

- selecting foods from each food group
- including a variety of vegetables to add colour
- avoid repeating the same food in different meals as well in the same meal in a different form.
- use different methods of cooking such as baking, boiling, frying to bring variety in texture.
- use alternative garnishes and accompaniments.



The form in which food is served influences food acceptance

c. Food habits and religious beliefs

Religious and socio-cultural beliefs influence the choice of food. Certain foods are prohibited by certain religions. Also, the socio-cultural factors either promote or prohibit the intake of particular foods indifferent families and communities.

d. Food availability and seasonal variation

As far as possible, seasonal and locally available foods should be used. Vegetables and fruits in season are not only cheap but have the highest nutrient content and best flavour.

e. Food Fads

Wrong notions and beliefs regarding consumption of food are prevalent in different communities many of which are baseless and may deprive an important nutrient source. For example, fad-like milk and fish should not be included in the same meal. These food fads need to be discouraged.

f. Portion sizes

While planning and preparing a meal, it must be ensured that the quantity prepared be easily consumed by the person of the given age, sex and

activity. At the same time, the quantity must meet nutritional needs. These quantities are referred to as “one serving portion” or “portion sizes”.

1.4 Steps in meal planning

The following steps may be adopted in planning meals.

1. Recommended Dietary Allowances

To plan a balanced diet the first step is to know the recommended dietary allowances for different age groups.

2. Food list

The next step is to prepare a food list ie., a list of quantities of various food groups to be included in the diet so that it is balanced and can meet the RDA. This can be done by

- Selecting foods from all the five food groups.
- Deciding the quantities of the selected foods as multiples of portion sizes.

The number of portion of various food groups to be included in planning a balanced diet for adults is given in Table- 1.2



Table 1.2 Portion size for menu plan

| Food groups | Portion (g) | Energy (Kcal) | Protein (g) | Carbohydrate (g) | Fat (g) |
|-----------------------------|----------------|------------------|----------------|---------------------|------------|
| Cereals and Millets | 30 | 100 | 3.0 | 20 | 0.8 |
| Pulses | 30 | 100 | 6.0 | 15 | 0.7 |
| Egg | 50 | 85 | 7.0 | - | 7.0 |
| Meat, chicken or fish | 50 | 100 | 9 | - | 7.0 |
| Milk (ml) and milk products | 100 | 70 | 3.0 | 5 | 3.0 |
| Roots and Tubers | 100 | 80 | 1.3 | 19 | - |
| Green leafy vegetables | 100 | 46 | 3.6 | - | 0.4 |
| Other vegetables | 100 | 28 | 1.7 | - | 0.2 |
| Fruits | 100 | 40 | - | 10 | - |
| Sugar | 5 | 20 | - | 5 | - |
| Fats and oils | 5 | 45 | - | - | 5 |

Source: Dietary Guidelines for Indians - A Manual by Kamala Krishnaswamy, B. Sesikera (Second Edition 2011), NIN, ICMR

To calculate the day's requirement of above-mentioned food groups for an individual, multiply gram per portion with the number of portions

For example, the quantity of cereals and pulses to be included for an adult man doing sedentary work is 375g (30 x 12.5) and 75g (30 x 2.5) respectively.

Table 1.3 Balanced diet for adults- sedentary/moderate/heavy activity (number of portions)

| | Portion (g) | Type of work | | | | | |
|---|----------------|--------------|-------|----------|-------|-------|-------|
| | | Sedentary | | Moderate | | Heavy | |
| | | Man | Woman | Man | Woman | Man | Woman |
| Cereals and millets | 30 | 12.5 | 9 | 15 | 11 | 20 | 16 |
| Pulses | 30 | 2.5 | 2 | 3 | 2.5 | 4 | 3 |
| Milk | 100 ml | 3 | 3 | 3 | 3 | 3 | 3 |
| Roots and tubers | 100 | 2 | 2 | 2 | 2 | 2 | 2 |
| Green leafy vegetables | 100 | 1 | 1 | 1 | 1 | 1 | 1 |
| Other vegetables | 100 | 2 | 2 | 2 | 2 | 2 | 2 |
| Fruits | 100 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sugar | 5 | 4 | 4 | 6 | 6 | 11 | 9 |
| Fats and oils | 5 | 5 | 4 | 6 | 5 | 8 | 6 |
| For vegetarians substitute one pulse portion with one portion of egg/meat/chicken/ fish | | | | | | | |

Source: Dietary Guidelines for Indians - A Manual by Kamala Krishnaswamy, B. Sesikera (Second Edition 2011), NIN, ICMR



Table 1.4 Balanced diet for infants, children, and adolescents (number of portions)

| Food groups | g/portion | Infants 6-12 months | 1-3 | 4-6 | 7-9 | Years | | | | | |
|---------------------------|-----------|---------------------------|-----|-----|-----|-------|------|-------|------|-------|------|
| | | | | | | 10-12 | | 13-15 | | 16-18 | |
| | | | | | | Girls | Boys | Girls | Boys | Girls | Boys |
| Cereals & millers | 30 | 0.5 | 2 | 4 | 6 | 8 | 10 | 11 | 14 | 11 | 15 |
| Pulses | 30 | 0.25 | 1 | 1.0 | 2 | 2 | 2 | 2 | 2.5 | 2.5 | 3 |
| Milk (ml) & milk products | 100 | 4* | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Roots & tubers | 100 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1.5 | 2 | 2 |
| Green leafy vegetables | 100 | 0.25 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Others vegetables | 100 | 0.25 | 0.5 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Fruits | 100 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sugar | 5 | 2 | 3 | 4 | 4 | 6 | 6 | 5 | 4 | 5 | 6 |
| Fat/ oil (visible) | 5 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 9 | 7 | 10 |

*Quantity indicates top milk. For breastfed infants, 200 ml top milk is required.

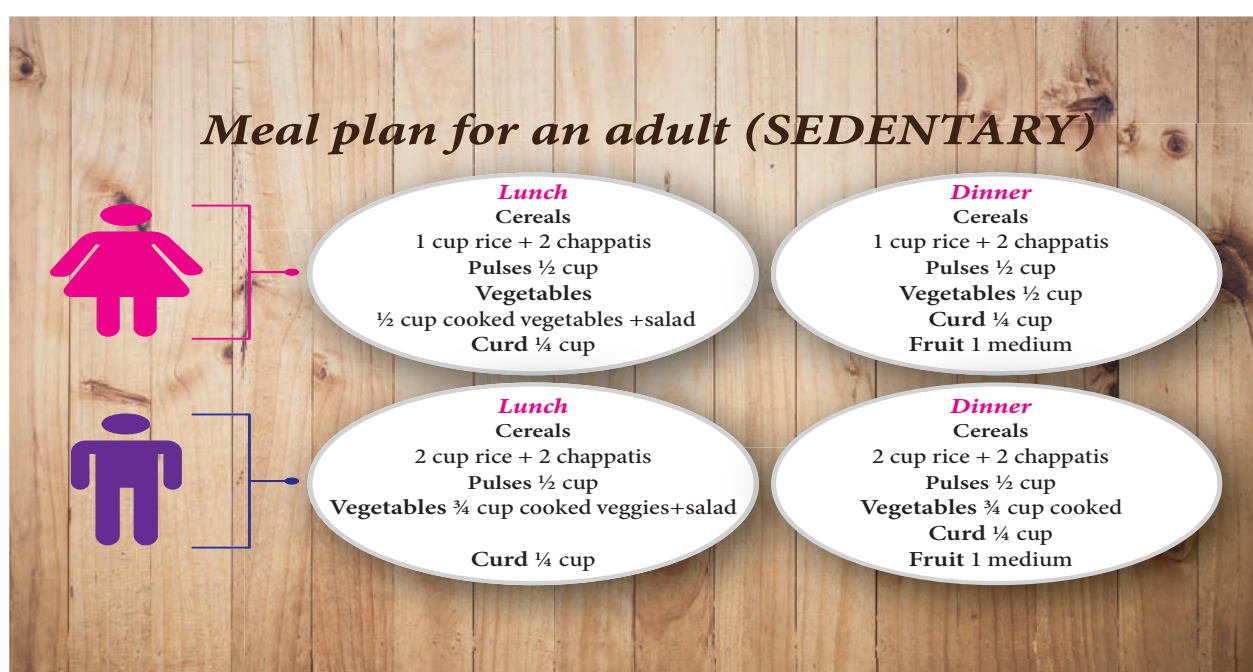
One portion of the pulse may be exchanged with one portion (50g) of egg/meat/chicken/fish

Source: Dietary Guidelines for Indians - A Manual by Kamala Krishnaswamy, B. Sesikera (Second Edition 2011), NIN, ICMR

3. Making the menu

The foods that are listed in step II are converted into the actual recipes and distributed in

different meals like breakfast, lunch, evening tea and dinner.



1 day menu for an adult (sedentary work)

- Energy – 2875 kcal
- Protein – 60 gm (60kg wt.)

| Meal | Food | Quantity |
|---------------|--|-----------------------------------|
| Early Morning | Milk or tea with sugar | 1 cup |
| Breakfast | Bread with egg or paratha with curd, coffee | 1 egg, 2 bread, 2 paratha, 1 |
| Mid-day | Fruit chat or fruit juice or Tea with biscuits | 1 cup, 4-6 |
| Lunch | Vegetables, Chapati, Rice, Curd, Salad | 1 cup, 2, 1 plate, 1 cup mixed |
| Evening Tea | Tea with snacks | 1 cup |
| Night Dinner | Dal/ rajama, Vegetables, Chapati | 1 cup 1 cup, 3 |
| Bed time | Kheer/fruit | 1 cup/fruit |

1.5 Food Exchange

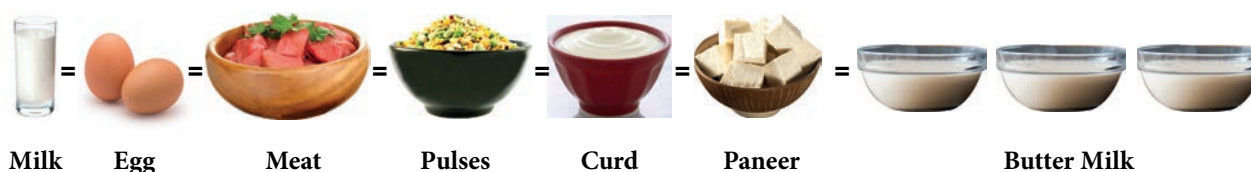
Each food group has similar food items that have been placed together in one food group. Therefore, if we substitute one food for the other in the same group, we will be able to get almost the same nutrients. For example, 'X' takes one glass of milk and roti in breakfast, 'Y' eats poha (rice flakes) and one Katori of curd whereas 'Z' eats one fresh cheese (paneer) sandwich. Looking at their food selection, all of them take milk or its product along with cereals and get approximately the same nutrients. So we can say that substitution of one food item with the other within a group in such a way that the nutrients provided by them are approximately the same is called '**Food Exchange**'.

Substitution of one food item with the other in such a way that the nutrients provided by them are the same is called "Food exchange".

If you are modifying the same meal for different family members, then how will you decide on how much of one item is equivalent to another one? If you are not sure about how to go about exchanging one food item with another in the correct proportion, then you may not be able to fulfill everyone's requirements correctly. For example, if you are exchanging milk with egg then you should know how much of milk is equivalent to one egg or if one does not want to eat an egg, in that case, how much of pulses should be given instead?

Food exchanges help you to modify the diet for an individual according to needs, likes, dislikes and food habits and help you to make the diet more flexible and interesting. The following illustration gives you a fair idea about the exchanges that can be done among various foods so that the nutrients derived by these foods remain the same.

Protein Rich Foods



1 glass of milk = 1 egg = 1 medium size katori meat = 1 big katori pulses
= 1 big katori curd = 1/4 cup of paneer = 3 cups of butter milk

Cereals



1 Chapati = 1 bread slice = 1 potato = 1/2 cup rice = 1/2 cup dhal = 4 salted biscuits = 1/2 cup noodles
= 1 idly = 1 plain dosa = 1/2 cup Upma/poha

Fat



1 tsp of butter = 1 tsp of oil = 2tsp mayonnaise = 4-5 pieces of nuts
= 10-12 pieces of peanuts = 5 tsp cream.



Activity : 1

Your brother does not like milk but your sister is very fond of it. How will you solve this problem?



Activity : 2

Select nutritious snacks from the following food items. (i) Aval Uppuma (ii) FrenchFries (iii) Kozhukkatai (iv) Vegetable cutlets (v) Pizza (vi) Puffs (vii) Peanut balls

1.6 Low-Cost Balanced Diets

The income of the family or more specifically, the amount of money available for food per person influence the kind and amount of food to be included in each meal. To understand this better consider the three income groups - low, middle and high.

People with limited income or those belonging to the lower income group may not be able to include much of milk, meat, and fruits in their daily diet as these are expensive foods. So the crucial decision is what food items to select that would enable them to plan nutritious meals at low cost. Well, there are many ways in which one

can ensure nutritious meals without increasing the cost. To begin with, one could use:

- ❖ more of the cheaper foods like cereals. It would further lower cost if high price cereals such as rice or wheat are partially replaced by millets i.e. ragi, jowar, bajra and partially by roots and tubers i.e. potato, colocasia, tapioca
- ❖ jaggery instead of sugar
- ❖ seasonal and locally available fruits and vegetables only
- ❖ food combinations (cereal and pulse) and processes like germination, fermentation improve the nutritive value (as they add extra nutrients without extra cost)
- ❖ cheaper variety of pulses and cheap nuts such as groundnuts
- ❖ vegetable oils to increase energy and essential fatty acid intake
- ❖ inexpensive yellow fruits like papaya or mango and greens to increase vitamin A and C intake
- ❖ green leafy vegetables to improve the intake of vitamin A, iron and calcium
- ❖ at least 150 ml of milk to improve the intake of riboflavin, calcium besides improving the protein quality of the diet.

People belonging to the “middle income group” can surely have more variety by including more of cereals (rice\wheat), pulses, milk, fruits, and vegetables. They can have reasonable amounts of fats\oils and sugar in their diets. However, use of nuts\oilseeds and other miscellaneous foods like jam, jellies etc would be limited. As income rises one gets the freedom to choose from a wide variety of foods –or out of season, locally available or purchased from outside. Consumption of milk and milk products, meat, vegetables, fruits, fats, and oils tends to increase. But care needs to be taken that foods like fats, oils, sugars, are not taken in amounts more than needed by the body.

1.6.1 Dietary Guidelines to reduce the cost of a meal

1. The inclusion of millets like ragi, jowar, and bajra can reduce the cost of a meal.
2. Combination of cereals and pulses improve the quality of cereal as well as pulse protein.
3. Pulses like horse gram can be included to reduce the cost of a meal.
4. Fermenting, malting and sprouting can be done at home which enhances the nutritive value without increasing the processing cost.
5. Greens, particularly from trees like drumstick or agathi, are cheaper. Locally available or kitchen garden produce can be used.
6. Leaves of cauliflower, carrots, knolkhol and beet root which are highly nutritious can become part of a meal. Curry leaves can be used in consumable form like chutneys, chutney powder or in ground form in curry leaves pulao.
7. Inexpensive and nutritious fruits like papaya and guava can be included in the diet.
8. Inclusion of dry fish (like nethili) may supply a good amount of nutrients without increasing the cost.

9. Jaggery can be used instead of sugar.
10. Toned milk with low fat is less expensive but gives all other nutrients except fat.
11. Steamed foods are less expensive than fried foods. Low-cost diets have less amount of fats, oils, and sugars.
12. Natural foods are less expensive compared to processed and preserved foods.
13. Foods that are distributed through the public distribution system (Ration shops) can be used.
14. Recipes made at home are cheaper than bought. Homemade food can be carried to the workplace instead of buying from the canteen.
15. The inclusion of locally available ingredients and seasonal foods reduce the cost of a meal



Activity : 3

Mr. A. is an accountant in a government office in Chennai. His office timings are 9.00 a.m. to 5.30 p.m. His meal pattern is as follows. He has bed-tea early morning. Before leaving for his office he eats a heavy breakfast. He carries a packed lunch to office (which he eats around 1.30 p.m.). Before lunch, around mid-morning, he usually takes tea along with his friends. Around 4- 4.30 p.m. he has another cup of tea supplemented with a snack. He returns home around 7.30p.m. and has dinner right away. Then late at night, before going to bed he drinks a glass of milk.

Now answer the following questions

- a) What is the meal frequency adopted by Mr. A?
.....
- b) List the various meals Mr. A has had in a day.
.....
- c) Can you suggest a menu for dinner for Mr. A?



POINTS TO REMEMBER

MEAL PLANNING

1. Plan meals according to the age, sex, income, activity pattern, work schedule of the individual.
2. Do plan meals in advance
3. Ensure that meals planned help to meet the recommended dietary intakes for each member of the family.
4. Include at least one food item from each of the three food groups in each meal.
5. Include seasonal and locally available foods in the meals.
6. Economize on the resource- time, labour and fuel.
7. Include in the meals those foods/dishes which are liked by family members.
8. Prepare the dishes in the way people know or are familiar with
9. Introduce variety by including foods of different colour, texture and flavor in each meal.
10. Avoid repetition of foods and method of preparing foods
11. Ensure that meals prepared relieve hunger and give a feeling of satisfaction and fullness.



Activity : 4

Look into the given menus and tell which is better one ? Why?

| Menu-I | Menu-II |
|--|---|
|  |  |
| Chapathi | Chapathi |
| Rice | Rice |
| Potato masala | Rajmah |
| Dhal | Lady's finger masala |
| Curd | Carrot raita |
| Salad | Salad (cabbage, cucumber, beetroot) |
| | Papad |

Make a list of different food items included in the meals consumed in your family yesterday. Categorize these food items into the four food groups. Analyze and discuss whether your family ate balanced meals or not.

| Meal | Food items | Food groups | Remarks |
|---------------|------------|-------------|---------|
| Early Morning | | | |
| Breakfast | | | |
| Mid morning | | | |
| Lunch | | | |
| Evening | | | |
| Dinner | | | |
| Post Dinner | | | |



Activity : 5

Give the capacity of the following

1. One tea cup – gms
2. One teaspoon – gms
3. One tablespoon – gms
4. $\frac{1}{4}$ cup – tsp
5. 2 table spoon – tsp

SUMMARY

- ❖ Each day our body needs a supply of a number of nutrients to carry out its activities efficiently. Nutrients are needed by humans in specific amounts to ensure good health and well being.
- ❖ Recommended Dietary Allowances (RDA) are estimates of intakes of nutrients which individuals in a population group need to consume to ensure that the physiological needs of all subjects in that population are met
- ❖ Recommended dietary allowances of an individual depend on many factors like Age, Sex, Physical activity, and Physiological state
- ❖ In order to meet the recommended dietary allowances, it is important to eat a balanced diet
- ❖ A “Balanced Diet” can be defined as one which contains different types of foods in such quantities and proportions that the need for calories, minerals, vitamins, and other nutrients is adequately met and a small provision is made for extra nutrients to, withstand short durations of leanness.
- ❖ A balanced diet should provide around 60-70% of total calories from carbohydrates, 10-12% from protein and 20-25% of total calories from fat.
- ❖ Meal planning helps in planning a balanced diet. Meal planning is a simple practical exercise which involves applying the knowledge of food, nutrient requirement, and individual preferences to plan adequate and acceptable meals.
- ❖ Meal planning helps to meet the nutritional requirements of the family, fulfills family needs, saves time and energy, provides variety, gives satiety and considers the individual likes and dislikes
- ❖ Food exchanges help us to modify the diet of an individual according to their needs, likes, dislikes and food habits and help us to make the diet more flexible and interesting
- ❖ The income of the family or more specifically, the amount of money available for food per person influence the kind and amount of food to be included in each meal. There are many ways in which one can ensure nutritious meals without increasing the cost.

A-Z

GLOSSARY

Terms

Activity level:

Meanings

Level of activity of a person-sedentary (light), moderate or heavy. Activity level is chiefly related to the occupation of an individual.

Pregnancy:

The state of carrying a developing embryo or fetus within the female body. Pregnancy lasts for about nine months

Lactation:

Period when the mother breastfeeds her infant.





| | |
|------------------------------|---|
| Meal Pattern: | Number of meals consumed in a day and the timing and nature of different meals. |
| Mid-afternoon meal: | Referring to a meal consumed between lunch and tea usually consisting of items like fruits, soups, beverages, snacks. |
| Mid-morning meal: | Referring to a meal consumed between breakfast and lunch usually consisting of a beverage and a snack. Soups and fruit-based items are also served. |
| Physiological stress: | Stress on the body due to normal physiological events unlike the stress caused by disease. Periods of physiological stress are generally rapid growth phases (e.g. infancy, adolescence, pregnancy, and lactation). |
| Food fads: | A fad diet is a diet that promises weight loss or other health advantages, such as longer life, and usually relies on pseudoscience rather than science to make many of its claims. |



Evaluation

I. Fill in the Blanks

- A balanced diet should provide _____ percent of calories from carbohydrate.
a) 50-60 b) 20-30 c) 40-50
- _____ Servings of fruits and vegetables should be included in a day.
a) Seven b) two c) five
- _____ can be used instead of sugar to reduce the cost of a meal.
a) sweeteners b) jaggery c) molasses
- Inclusion of millets like _____ and _____ also helps to reduce the cost of a meal.
a) Ragi and bajra b) wheat and rice
c) brown rice and red rice
- Meal planning is both a _____ and an Art.
a) Science b) Philosophy c) Chemistry
- During periods of physiological stress nutrient needs are _____.
a) Increased b) decreased c) no change
- Nutritive value of pulses can be improved by _____.
a) Roasting b) boiling
c) sprouting
- Use _____ vegetables and fruits, which are rich in nutrients and are available at a reasonable cost.
a) imported b) seasonal c) organic
- One-third of the day's calorie and protein requirements should be met by _____.
a) tea b) breakfast c) lunch
- 100 ml of milk provides _____ k.cal of energy.
a) 70 b) 30 c) 40
- 30g of pulses provide an average of _____ g protein.
a) 6 b) 15 c) 20





II. Answer the following (2 marks)

1. Define a Balanced diet.
2. Define RDA.
3. Define Reference man.
4. Define Reference Woman.
5. Define Food exchange list.
6. What is Meal Planning?
7. List sedentary activities.

III. Answer the following (3 marks)

1. Explain the objectives of planning a meal.
2. List the importance of a balanced diet.
3. List the importance of planning a menu.
4. Discuss the factors determining RDA.
5. How can you ensure nutritional adequacy in meals?
6. How can you achieve variety in meals?
7. List the ways by which you can maximize nutrients in a meal plan.
8. Why is it important to consider the likes and dislikes of individual family members during meal planning?
9. Classify occupations based on activity.

10. What are the qualities of a well-planned meal?
11. Differentiate between seasonal foods and out of season foods.
12. List at least two points you will keep in mind in order to prepare an attractive and appealing meal.
13. List the different types of work. Which kind of work requires maximum energy?
14. What are the requirements of a Balanced Diet?

IV. Answer the following (5 marks)

1. What are the factors to be considered in planning a menu?
2. What are food exchange lists? How are they used in planning diets?
3. Discuss in detail the steps involved in planning a menu.
4. Describe the different ways by which you can reduce the cost of a meal?
5. What are the points to be considered in planning a diet?
6. What are recommended dietary allowances? How were they arrived at?

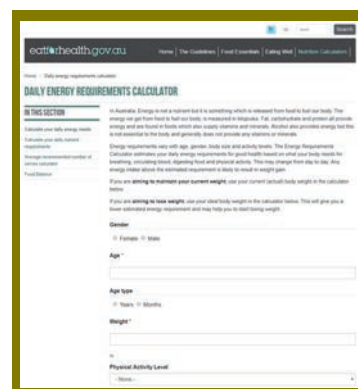


ICT CORNER

RECOMMENDED DIETARY ALLOWANCE AND MEAL PLANNING

Eager to know the proper meal?

Let's check that here..



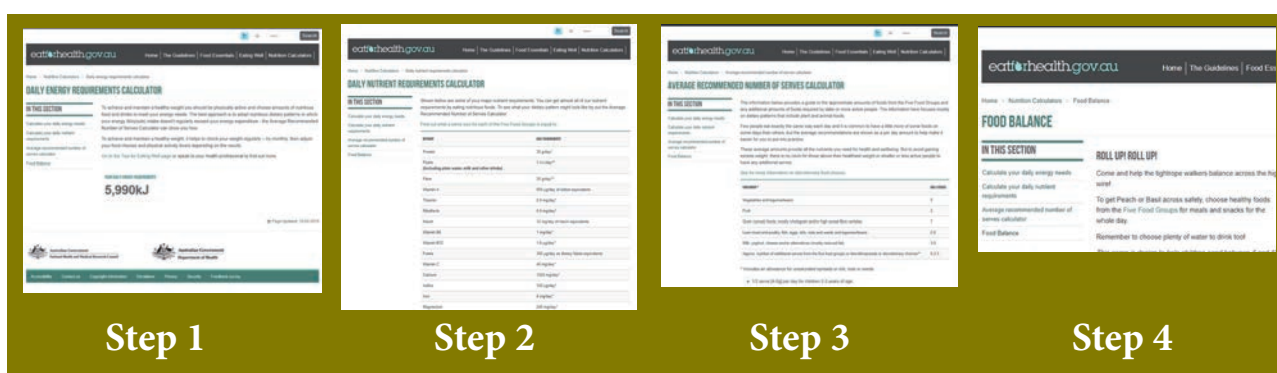
Steps:

Step 1: Use the URL or scan the QR Code to launch the “Daily energy requirements calculator” activity page.

Step 2: Click on “Calculate your energy needs” on the left of the window, feed in the details to know the energy need.

Step 3: Click on the “Calculate your daily nutrient requirements” and “Average recommended number of serves” to know them respectively.

Step 4: You shall know the “Balance Diet” by playing the game suggested.



DOWNLOADING

To go inside the app directly you can either use QR code or the given link

<https://www.eatforhealth.gov.au/node/add/calculator-energy>

*Pictures are indicative only

