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# APPLIED NUTRITION & DIETETICS for BSc Nurses

**Highlights**

- As per the revised Indian Nursing Council curriculum
- Completely revised each chapter of the book
- Added a new chapter on food safety
- Updated and revised tables and diagrams for diet plans

## Semester II

*Previously Known as Comprehensive Textbook of Nutrition for BSc Nurses*

2nd Edition



***As per the Revised INC Syllabus***

**Rishi Dutt Avasthi**

*Forewords*
**Meenal Arvind Rane**
**Mahipal Singh**

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# Balanced Diet

7 CHAPTER

**CHAPTER OUTLINE**

**Balanced Diet**
- Definition, Principles, Steps
- Food Guides: Basic Four Food Groups
- RDA: Definition, Limitations, Uses
- Food Exchange System
- Calculation of Nutritive Value of Foods
- Dietary Fiber

**Nutrition across Life cycle**
- Meal Planning/Menu Planning: Definition, Principles, Steps
- Infant and Young Child Feeding (IYCF) Guidelines: Breastfeeding, Infant Foods
- Diet Plan for Different Age Groups: Children, Adolescents and Elderly
- Diet in Pregnancy: Nutritional Requirements and Balanced Diet Plan
- Anemia in Pregnancy: Diagnosis, Diet for Anemic Pregnant Women, Iron and Folic Acid Supplementation and Counseling
- Nutrition in Lactation: Nutritional Requirements, Diet for Lactating Mothers, Complementary Feeding/Weaning

Human bodies are machines and food are fuel for the body. Whatever we eat affects our body, work, and how long we live. It is especially important that we eat healthily as children, as we are still growing and developing, a young plant not given proper nutrients grows up to be a poor specimen. A healthy diet is sometimes called a balanced diet as it needs to consist of different types of foods. Eating properly and regularly is really important; what we eat and drink now, affects our health in the future.

Everyone, whether involved in sport or not, should try to eat a healthy, balanced diet.

A balanced diet includes all the things that your body needs. To achieve this, you need to eat a range of different types of food in the right proportions. If you eat a balanced diet, you will get the energy

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and nutrients required to participate in exercise and to recover from it quickly:

- To obtain adequate amounts of each of the distinct nutrients.
- Daily diet should include appropriate quantities of a variety of distinct foodstuffs.
- A faulty diet and diet habits is not only distasteful but may also have serious consequences on health and recovery from disease.
- Diet in which various foodstuffs are mixed in suitable proportions to carry out adequately the three functions described above, is known as a balanced diet.
- Balanced diet provides all nutrients in required amounts and proper proportions.

## Definition

Balanced diet is the one which contains a variety of foods in such quantities and proportions that the need for energy, proteins, vitamins, minerals and fats are adequately met for maintaining health, vitality and general well-being and also makes a small provision for extra nutrients to withstand short duration of leanness.

Objective is to safeguard the population from nutritional deficiencies.

## Principle

It should meet the energy intake from:

- Protein should be—10–15% of energy intake
- Fats should be—15–30% of energy intake
- Carbohydrate should be the remaining part.
- Pattern of balanced diet varies in different parts of the world.

## Determinants Factors Affecting Diet

- Region (area)
- Economic status of the family
- Religion and caste
- Customs and rituals
- Culture and belief
- Taboos and social norms
- Taste and choice of food
- Habits of the people

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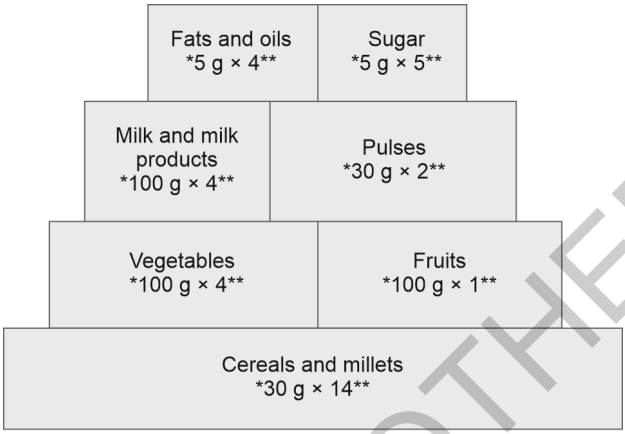
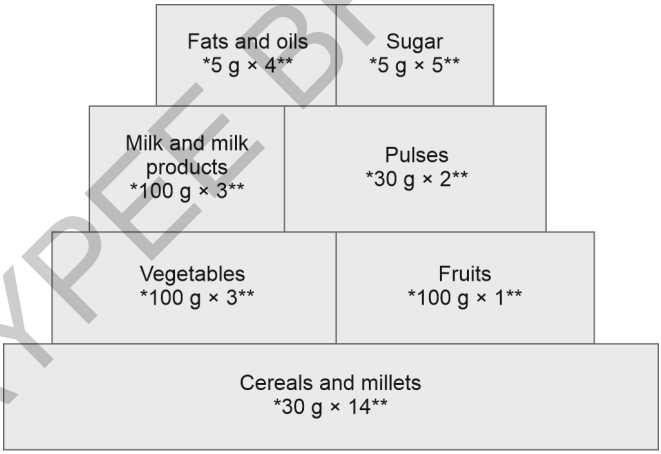
## Balanced Diet for Adult Man (Sedentary)




* Portion size ** No. of portions

## Balanced Diet for Adult Woman (Sedentary)




* Portion size ** No. of portions

## Individual Energy Needs Per Day (Kcal)

| *Age-groups* | *Male (kcal)* | *Female (kcal)* |
|---|---|---|
| Child—6 months | 700 | 650 |
| Child—8 months | 1,970 | 1,740 |

*Contd...*

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*Contd...*

| *Age-groups* | *Male (kcal)* | *Female (kcal)* |
|---|---|---|
| 16 years old | 2,700 | 2,100 |
| Adult working in an office | 2,500 | 2,150 |
| Adult doing heavy physical work | 3,350 | 2,550 |
| A retired person aged 75 years | 2,150 | 1,700 |

## Individual Energy Needs Depends on Factors

The amount of energy required varies from person to person. It depends on a number of factors:

- **Age:** As you grow up and your body gets larger, it requires more energy. However, after the age of about 40, your metabolism slows down and you do not need to eat as much.
- **Size:** Larger people require more energy to keep their bodies functioning and to move them around.
- **Sex:** Males usually require more energy than females because they tend to be more heavily built.
- **Lifestyle:** The more activity you do, the more energy you will require.

## Energy Balance

### *Energy Used in Different Activities*

| *Activity* | *kcals per hours* |
|---|---|
| Ironing | 140 |
| Walking briskly | 300 |
| Swimming | 400 |
| Tennis | 490 |
| Jogging | 600 |

## DIFFERENT FOOD GROUPS NEED AS PER TYPE OF WORK

| *Food groups* | *Gram/ portion* | *Type of work* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Sedentary* | | *Moderate* | | *Heavy* | |
| | | Man | Woman | Man | Woman | Man | Woman |
| **Cereals and millets** | 30 | 14 | 10 | 16 | 12 | 23 | 16 |
| **Pulses** | 30 | 2 | 2 | 3 | 2.5 | 3 | 3 |

*Contd...*

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*Contd...*

| Food groups | Gram/ portion | Type of work | | | | | |
|---|---|---|---|---|---|---|---|
| | | Sedentary | | Moderate | | Heavy | |
| **Milk** | 100 mL | 3 | 3 | 3 | 3 | 3 | 3 |
| **Roots and tubers** | 100 | 2 | 1 | 2 | 1 | 2 | 2 |
| **Green leafy vegetables** | 100 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Other vegetables** | 100 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Fruits** | 100 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Sugar** | 5 | 5 | 4 | 8 | 5 | 11 | 9 |
| **Fats and oils (visible)** | 5 | 4 | 4 | 7 | 6 | 11 | 8 |

## FOOD GUIDES—BASIC FOOD GROUPS

### Carbohydrates

- Complex carbohydrates should provide around half of your daily energy needs.
- If you are performing strenuous exercise, this should increase to 60–70%.
- Energy from carbohydrates is converted to a substance called glycogen. This is stored in the liver and the muscles.
- When energy is needed, the body changes the glycogen to glucose which is used by the muscles during respiration.
- If you eat too much carbohydrate, the body will store it as fat.

### Fats

- Fats are also used for energy, but only when stores of carbohydrate run low.
- Weight-for-weight, fat contains more than twice as much energy as carbohydrates or proteins. However, lots of oxygen is required to release this energy. This means that energy can only be released slowly from fats.
- Fats supply the energy we need for endurance activities.
- Saturated fats can be converted into cholesterol by the liver. High blood cholesterol is linked to heart disease.

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- For this reason, no more than 10% of your energy should come from eating saturated fat.
- Because fat contains so much energy, you can easily eat more than your body needs.
- Excess fat is stored as body fat, causing weight gain.
- In some sports like sumo wrestling and shot-putting, extra bulk can be an advantage. However, for most performers, extra body fat will hamper their performance.
- If your body weighs more, it is more difficult to move. Sports people who need to move fast, like runners and games players, should limit the amount of fat in their diet.

## Protein

- Proteins are used to generate energy only when the body has exhausted its stores of carbohydrates and fats.
- Proteins are very important in the body for other reasons. Our muscles and other tissues are made from proteins.
- Proteins are also needed by performers who are recovering from injury in order to repair damaged tissue.

## Vitamins

Your body needs vitamins to help it work normally. Vitamins are needed for many functions including:

- Releasing energy from food
- Repair and growth of tissues
- Resisting infection and disease
- Regulating chemical reactions in the body.

### *Vitamin Sources and Needs for Body*

| *Vitamin* | *Sources* | *Need* |
|---|---|---|
| **Vitamin A** | Fish, milk, vegetables, eggs and cheese | Eyesight, healthy skin |
| **Vitamin B** | Whole grain food, nuts and meats | Breaking down CHO |
| **Vitamin C** | Fruit, (especially citrus fruit) and vegetables | Healthy teeth, gums, avoiding scurvy |
| **Vitamin D** | Animal products | Absorbing calcium and phosphorus avoiding rickets |

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## Minerals

Minerals are basic elements that are found in the air and the earth. The body needs small amounts of certain minerals in order to stay healthy.

| *Minerals* | *Sources* | *Need* |
|---|---|---|
| **Calcium** | Vegetables, dairy products and dried fish | Keeping bone and teeth hard |
| **Iron** | Red meat, liver, beans, lentils and green vegetables | Making blood, preventing tiredness and anemia |
| **Iodine** | Seafood and dairy products | Maintaining the thyroid gland |

## Fibers

- Fiber is actually a substance called cellulose. It is found in the cell walls of plants.
- Fruit, vegetables and whole-grain cereals are good sources of dietary fiber.
- Fiber cannot be digested, but it is required to aid the smooth working of our digestive system.
- People who eat too little fiber often suffer from constipation and may run a higher risk of bowel cancer.

## Water

- Approximately 60% of an adult's weight and approximately 80% of a child's weight is made up of water.
- It is vitally important that you drink enough water.
- Dehydration can seriously damage performance.
- Water plays an integral part in regulating our body temperature when exercising.
- When we exercise, the body secretes water as sweat. As the sweat evaporates off our skin, it takes heat with it, helping the body to stay cool.
- Being dehydrated can severely affect performance. Dehydration, equivalent to losing as little as 2% of body weight, can result in impaired performance responses.

# FOOD GROUPS

## Cereals and Grains

- Cereals are grasses cultivated for the edible components of their grain; composed of the endosperm, germ, and bran.

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- Cereal grains are grown in greater quantities and provide more food energy worldwide than any other type of crop; they are therefore 'staple crops.'

### *Types of Grains*

- Whole grains refer to grains that have all of the parts of the grain seed (bran, germ and endosperm). Examples: Brown bread and rice, maize, oat, barley, millet.
- 'Refined grain' is processed grain when some of the dietary fiber and other important nutrients are removed. Examples: Refined grains (white bread and rice, pasta, noodles).

## Vegetables

Vegetables comprise any plant part, other than fruit which is used as food. They include:

- Roots and tubers (potatoes, turnips, carrots)
- Bulbs (onions)
- Stems (celery)
- Leaves (lettuce and cabbage)
- Flowers (broccoli and cauliflower)
- Peas and beans are legumes but when immature and green are treated as vegetables.

## Fruits

- In its strict botanical sense, a 'fruit' is the fleshy or dry ripened ovary of a plant enclosing the seed.
- Fruit forms from the flower and contains the seeds of the plant.
- Some vegetables like tomatoes and pumpkin are the fruit of the plant, but they are used as vegetables.
- Fruit is a good source of vitamins, including vitamin C and folate, carotenoids as well as useful amount of potassium.
- It also provides carbohydrates, in particular, natural sugars and fiber, especially in the edible skins.
- The sugar that makes them sweet provides energy.
- Fruits and vegetables grow on plants: underground, on the ground or in trees.
- Every day we should eat at least 5 portions of fruit and vegetables. (A portion is about a handful.)
- Fruit and vegetables give us fiber, vitamins and minerals.

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## Grains and Pulses

- This food group includes wheat, corn, barley, rice, lentils, beans, etc.
- These are all from plants and form a staple part of the diet for people all over the world.
- Grains and pulses give us carbohydrates and proteins.
- Nuts are another source of protein.
- This food group includes wheat, corn, barley, rice, lentils, beans, etc.
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- Grains and pulses give us carbohydrates and proteins.
- Nuts are another source of protein.

## Dairy Products

- Milk, yogurt and firm cheese are the three important foods in this group.
- The foods in this group are an excellent source of calcium.
- Milk carries B group vitamins, particularly riboflavin and vitamin $B_{12}$, and the fat-soluble vitamins A and D.
- These foods are also a good source of fats and protein, but is low in iron.
- Lactose is the principal sugar in milk, and milk is the only source of lactose in nature.
- The lactose enhances the absorption of calcium and phosphorus from the intestine.
- Dairy foods are made from milk (usually cow's milk, but can be from other animals like goats or sheep). Dairy foods give us proteins and fats. They are also a good source of calcium which is good for bones and teeth.

These foods include:

- Cheese (hard, soft, cottage)
- Yogurt
- Food high in milk or milk products.

## Meat, Fish and Eggs

- There is a wide variety of foods in this group.
- It consists of all kinds of meat, poultry, fish, eggs, nuts and nut pastes such as peanut butter, legumes, and some seeds such as sunflower and sesame seeds.

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- The foods in this group are a good source of protein, iron, niacin and vitamin $B_{12}$.
- The main nutrients derived from meat are proteins, but it also gives us fats and some minerals.

The meat and fish group includes:

- Chicken and all poultry
- Fish and shellfish
- Beef, pork and lamb
- Eggs are included in this group too.

Athletes eat lots of protein; they help to build muscles.

## Nuts and Seeds

- Nuts and seeds have been valued for their oils as much as for a food in itself; their high content of energy, protein, vitamins, and minerals makes them a very nutritious food.
- The energy content of nuts is mostly due to their high fat content.
- Common types of nuts include almonds, walnuts, Brazil nuts and hazelnuts. Sunflower, sesame, and pumpkin are the most common seeds eaten as foods.

### *Legumes*

- Legumes are the edible seed from the Leguminosae family and include dried peas, beans, lentils, pulses and chickpeas.
- Of all foods, legumes most adequately meet the recommended dietary guidelines for healthful eating.
- They are high in carbohydrate and dietary fiber, mostly low in fat, supply adequate protein while being a good source of vitamins and minerals.

## Starches, Sugars and Fats

- Fats, oils and sweets give us calories.
- Fats, oils and sweets add flavor and variety to our diets.
- Most of these foods do not contain many vitamins or minerals. So they are called "empty calorie" foods.

## Vitamins and Minerals

| *Nutrients* | *Function* | *Sources* |
|---|---|---|
| **Vitamin A** | Helps maintain eyesight | Sweet potatoes, carrot |
| **Vitamin B** | Help body make protein | Green leafy vegetables |

*Contd...*

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*Contd...*

| *Nutrients* | *Function* | *Sources* |
|---|---|---|
| **Vitamin C** | Healing skin, prevents colds | Citrus fruits, tomatoes |
| **Vitamin D** | Strengthens bones | Milk, sunlight |
| **Vitamin E** | Helps in fertility | Vegetables, oils, nuts |
| **Iron** | Healthy oxygen saturation | Green leafy vegetables |

## RECOMMENDED DIETARY ALLOWANCE (RDA)

### Definition

Amount of the nutrient sufficient for the maintenance of health in nearly all people. For all nutrients except energy,

RDA = minimum requirement + safety margin (individual variation)

RDA does not apply to sick people.

The RDA represents the average daily dietary intake that is sufficient to meet the nutrient requirement of nearly all (97–98%) healthy individuals in a population. The RDA is to be used as a guide for the individual.

### Uses of RDA

- It is useful in comparison of individual intakes and an estimate to identify probable risk of deficiency among individuals.
- It is helpful in modifying nutrient requirements in clinical management as per diseases condition.
- To help dietician and nutritionists to prepare diets for schools, hospitals, prisons as per their requirement.
- It is useful in designing, developing nutrition intervention programs and policies for public health policymakers.
- It is useful in planning and maintaining procuring food supplies for different population groups
- Helpful in evaluating the adequacy of food supplies in meeting national nutritional needs.

### Limitation of RDA

- RDA is imitated to heterogenicity among aging people.
- It is limited to physiological changes associated with the aging process.

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- Limited to individual health status and presence of chronic disease.
- It is not realistic to assume that all older adults over 50 have similar nutrients requirements.
- RDA only prevents disease not promotes health.
- It does not meet needs of those with increased demand or illness.
- It is not accountable for biochemical individuality.
- Cannot be estimated RDA for every nutrient.
- It is not user-friendly for public.
- No data for fiber, cholesterol and fat.

## Components of RDA

- Reference body weight
- Intake: Nutrient intake is assumed to follow Gaussian distribution, unless it is known to be otherwise.
- Bioavailability
- Healthy well-being,
- Based on the most recent scientific evidence review.

## Referred Man

- Age: 20–39-year weight: 60 kg
- Healthy, fit for active work
- He spends 8 hours daily on occupational work (moderate activity).
- While not at work, he spends 8 hours in bed.
- 6 hours sitting and moving around.
- 2 hours walking and household work.

## RDA (Per Day) of Protein, Fat, Calcium and Iron Indians (ICMR)

| *Age* | *Body weight (kg)* | *Net energy (kC)* | *Protein (g)* | *Fat (g)* | *Ca (mg)* | *Fe (mg)* |
|---|---|---|---|---|---|---|
| **0–6 months** | 5.4 | 108/kg | 2 g/kg | – | 500 | – |
| **6–12 months** | 8.6 | 98/kg | 1.6 g/kg | – | „ | – |
| **1–3 years** | 12.2 | 1240 | 22 | 25 | 400 | 12 |
| **4–6 years** | 19.0 | 1690 | 30 | „ | „ | 18 |
| **7–9 years** | 26.9 | 1950 | 41 | „ | „ | 26 |

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# APPLIED NUTRITION & DIETETICS for BSc Nurses

*Applied Nutrition and Dietetics for BSc Nurses* (second edition) is precisely written as per the Indian Nursing Council's revised syllabus for BSc nursing students. It is also useful for GNM students and distinct healthcare personnel.

***Salient Features***

- This book has been written as per INC's revised syllabus for BSc nursing course.
- This book provides complete required content in a very comprehensive manner to meet all the necessities of nursing students.
- This book provides a practical-based diet plan and menu plan for their application to the cookery practical classes and food preparations.
- This book is an example-oriented book, with several examples of different nutritional substances and examples of diets in different diseases.
- This book is prepared in a very concise, systematic, and logical manner for a better understanding of nursing students.
- This book also consists of long answers, short answers, and more than 150 multiple choice questions (MCQs) from each chapter, which will be helpful for all students for examination preparation and to understand important aspects of the chapter.

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**Medical Publishers (P) Ltd.**
**EMCA House, 23/23-B, Ansari Road, Daryaganj, New Delhi - 110 002, INDIA**
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ISBN 978-93-5696-113-5