Nutrition

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What is Nutrition?

Nutrition is the biochemical and physiological process by which we use food to support life. All forms of life require carbon, energy, and water as well as various other molecules. Humans require complex nutrients such as carbohydrates, lipids, and proteins. We obtain them by consuming various foods like vegetables, fruits and meat. It provides us with nutrients, which can be metabolized to create energy and chemical structures.

Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes, hypertension and cardiovascular disease), and longevity. Healthy children learn better. People with adequate nutrition are generally more productive. Good nutrition will help you feel better, think more clearly, and be healthier.

Why should everyone know about Nutrition?

As stated above, Nutrition is an important process by which we can live a long, healthy and productive life. But without a proper knowledge of nutrition, we may eat in a disorderly manner, which would eventually result in mal-nutrition (both under nutrition and over nutrition) leading to many life-style disorders and chronic non-communicable diseases.

Failure to obtain sufficient nutrients causes malnutrition. Malnutrition, in every form, presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both under-nutrition and over-nutrition (overweight), especially in low- and middle-income countries like Africa and India.

Equipped with good knowledge about nutrition, our daily energy and nutrition requirements, the importance & functions of various nutrients in our body we can maintain a healthy and productive life. By making a conscious effort to regularly choose healthier foods, you can help your body fight off disease.

What are nutrients?

The foods we eat contain nutrients. Nutrients are substances required by the body to perform its basic functions. Nutrients have one or more of three basic functions: they provide energy, contribute to body structure, and/or regulate chemical processes in the body. These basic functions allow us to grow, and reproduce.

What are the different types of nutrients?

There are six classes of nutrients required for the body to function and maintain overall health. These nutrients are broadly categorised into **Macronutrients** and **Micronutrients**.

Nutrients that are needed in large amounts like carbohydrates, lipids, and proteins are called **Macronutrients**. Macronutrients are major sources of energy.

Micronutrients are nutrients required by the body in lesser amounts but are still essential for carrying out bodily functions. Micronutrients include all the essential minerals and vitamins. There are sixteen essential minerals and thirteen vitamins.

Water is one other macronutrient that we must have in large quantities, but it does not contain any calorie.

What is Energy and how do you measure it?

Body needs energy for maintaining body temperature and metabolic activity for supporting physical work and growth. Energy is a fuel provided by the food we consume. The recommended energy allowances are developed to provide sufficient energy that would support satisfactory growth in infants and children and maintain appropriate body size and composition associated with good health in all stages of life.

The factors which influence energy needs are age, gender, body size, level of physical activity and, to some extent, climate and altered physiological status such as pregnancy and lactation.

Humans get energy from the food we eat, hence we call it **Food energy**. A unit of measurement of food energy is the **calorie**. A **kilocalorie (Calorie)** is the amount of heat generated by a particular macronutrient that raises the temperature of 1 kilogram of water by 1 degree Celsius. The value of calorie is measured by the process of **Calorimetry**, performed using **Calorimeter**.

The unit of energy, which has been in use in nutrition for a long time, is **Kilocalories (Kcal)**. However, recently the International Union of Sciences and International Union of Nutritional Sciences (IUNS) have adopted **‘Joule’** as the unit of energy in the place of Kcal.

How much energy and nutrients do we need?

Humans need a wide range of nutrients to lead a healthy and active life. The required nutrients for different physiological groups can only be derived from a well-balanced diet. The amount of each nutrient needed for an individual depends upon his/her age, body weight and physiological status. For example, adults need nutrients to maintain a constant body weight and to maintain proper body function, but children need nutrients not only for maintenance but also for growth. Pregnant women and lactating mothers need additional nutritional demands for normal growth of infants in utero and during early post-natal life.

Our health is also determined by height, weight and the amount of fat in our body. Therefore, it is necessary to maintain an optimal weight throughout our life. We must also remember that disordered eating is also bad. For example, Calcium is good for bones and teeth, but a disordered eating habit of taking too much calcium is not good for the body. This is why a balanced diet is important, for it gives us a balance of all nutrients. Achieving balance in your diet entails not consuming one nutrient at the expense of another. Additionally, it would be best to balance how many calories you consume with how many you burn every day. Eating any food in moderation is the best way to maintain all the aspects of healthy eating.

In India, the National Institute of Nutrition, under Indian Council for Medical Research has published **Dietary Guidelines for Indians** and **Nutrient Requirement for Indians**. These two books contain information regarding the Ideal Body Weight, Body Mass Index, Energy and other nutrients Recommended Daily Allowances (RDA) for Indian population. Indians can use this information to make healthy choices.

What is RDA & What it means?

RDA is short for **Recommended Dietary Allowances**. The RDA is for healthy individuals and may be prescribed to satisfy the nutritional needs of specific nutrients in a specific life stage and gender group and ensures that there is a very small risk of the nutrient intake being inadequate. With the RDA, there is also the risk of excess intake, since each individual may not actually require that much. There is no need to consume higher doses on regular basis or for prolonged period without supervision. In addition, nutrients are also toxic when ingested at very high doses.

What is Body Mass Index?

Body Mass Index (BMI) is a measure of body fat based on height and weight. Normal BMI range for Indian adults differ from BMI range for people from other countries. It also varies according to the age in children. Generally, a normal BMI range for Indians is **17.6 – 25.4 for males** and **16.5 – 25 for females**. A normal BMI means that the individual is having the correct proportion of height & weight and has a lower risk of developing life-style disorders and non-communicable chronic diseases.

Ideal Body Weight / Reference body weight is the generally accepted weight for the given age and height. A detailed table of BMI and reference body weight is given in the appendix section.

DIETARY GOALS

(from Dietary Guidelines for Indians)

1. Maintenance of a state of positive health and optimal performance by maintaining ideal body weight

2. Ensuring adequate nutritional status for pregnant women and lactating mothers

3. Improvement of birth weight and promotion of growth of infants, children and adolescents to achieve their full genetic potential

4. Achievement of adequacy in all nutrients and prevention of deficiency diseases

5. Prevention of chronic diet-related disorders

6. Maintenance of the health of the elderly and increasing the life expectancy

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DIETARY GUIDELINES

(from Dietary Guidelines for Indians)

Right nutritional behavior and dietary choices are needed to achieve dietary goals. The following 15 dietary guidelines provide a broad framework for appropriate action:

1. Eat variety of foods to ensure a balanced diet

2. Promote exclusive breastfeeding for six months and encourage breastfeeding till two years or as long as one can

3. Feed home-based semi-solid foods to the infant after six months

4. Ensure adequate and appropriate diet for children and adolescents, both in health and sickness

5. Eat plenty of vegetables and fruits

6. Ensure moderate use of edible oils and animal foods and very less use of ghee/butter/vanaspati

7. Avoid overeating to prevent overweight and obesity

8. Exercise regularly and be physically active to maintain ideal body weight
9. Restrict salt intake to minimum
10. Ensure the use of safe and clean foods
11. Adopt right pre-cooking processes and appropriate cooking methods
12. Drink plenty of water and take beverages in moderation
13. Minimize the use of processed foods rich in salt, sugar and fats
14. Include micronutrient-rich foods in the diet of elderly people to enable them to be fit and active

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ADVISES FOR A HEALTHY LIFESTYLE & LIFE

Advises on Cooking / Eating / Drinking habits (for all)

Cooking:

1. Wash vegetables and fruits thoroughly before use
2. Store the raw and cooked foods properly and prevent microbial, rodent and insect invasion
3. Refrigerate perishable food items. Maintain good personal hygiene and keep the cooking and food storage areas clean and safe. Always use thoroughly cleaned utensils for cooking/eating
4. Do not wash food-grains repeatedly before cooking
5. Do not wash vegetables after cutting; Do not soak the cut vegetables in water for long periods
6. Do not discard the excess water left over after cooking, use them as broth; Use only sufficient water for cooking
7. Cook foods in vessels covered with lids
8. Prefer pressure/steam cooking to deep frying/roasting
9. Avoid use of baking soda while cooking pulses and vegetables

10. Do not reheat the left over oil and fats repeatedly

Eating:

1. Develop healthy eating habits and move as much as you can to avoid sedentary lifestyle. Prefer whole foods. The term whole foods mean food prepared as close to their natural state as possible. For example, an apple is a whole food, while factory made, packed apple juice is not.

2. Discourage overeating

3. Prefer fresh, locally available vegetables and fruits

4. Grow the family's requirements of vegetables in the kitchen garden if possible

5. Minimize consumption of ready-to-eat fast foods, bakery foods and processed foods prepared in hydrogenated fat

6. Use of re-heated fats and oils should be avoided

7. Achieve energy balance and appropriate weight for height

8. Prefer traditional, home-made foods

9. Avoid replacing meals with snack foods

10. Limit consumption of sugar and unhealthy processed foods which provide only (empty) calories

11. Always read food labels (given on containers) regarding content of nutrients, shelf-life and the additives present

12. Choose a variety of foods in amounts appropriate for age, gender, physiological status and physical activity

13. Include green leafy vegetables in daily diet; Eat as much of other vegetables as possible daily. Consume raw and fresh vegetables as salads. Let different varieties of vegetables and fruits add colour to your plate and vitality to your life

14. Include foods of animal origin such as milk, eggs and meat (in small amounts), particularly in the diet of pregnant and lactating women and children

15. Use a combination of whole grains, sprouted grams, fermented foods and greens

Drinking:

1. Drink enough water to maintain proper hydration by referring to the urine colour indication chart below.

2. Drink boiled water, when the safety of the water is in doubt.

3. Consume at least 250 ml of boiled or pasteurized milk per day.

4. Drink natural and fresh fruit juices instead of carbonated beverages.

Pregnant women and lactating mothers:

1. Take iron, folate, and calcium supplements regularly, after 14–16 weeks of pregnancy and continue the same during lactation.

2. Start breastfeeding within an hour after delivery and do not discard colostrum.

3. Breastfeed exclusively (not even water) for a minimum of six months if the growth of the infant is adequate. Continue breastfeeding in addition to nutrient-rich complementary foods (weaning foods), preferably up to 2 years.

4. Breastfeed the infant frequently and on demand to establish and maintain good milk supply.

5. Breast milk alone is not enough for infants after 6 months of age. Complementary foods should be given after 6 months of age, in addition to breastfeeding.

6. Do not delay complementary feeding.

7. Feed homemade complementary foods on demand 3–4 times a day.

8. Provide seasonal fruits and soft-cooked vegetables.

9. Observe hygienic practices while preparing and feeding the complementary food.

Adults:

1. Adults should choose low-fat, protein-rich foods such as lean meat, fish, pulses, and low-fat milk.
2. Avoid alcohol and tobacco (smoking and chewing), especially during pregnancy and lactation.
3. Take medicines only when prescribed.
4. Take just enough fat.
5. Moderate the use of animal foods containing high fat, Saturated Fatty Acids, and cholesterol.
6. Limit the use of ghee, butter, especially vanaspati as a cooking oil.
7. Choose low-fat dairy foods in place of regular whole-fat dairy foods.
8. Eat foods rich in alpha-linoleic (ALA) acid such as legumes, green leafy vegetables, fenugreek, and mustard seeds.
9. Eat fish more frequently (at least 100–200g/week), prefer it to meat and poultry, and limit/avoid organ meats such as liver, kidney, brain, etc.
10. Egg has several important nutrients but is high in cholesterol. Limit the consumption to 3 eggs/week. However, egg white may be consumed in good amounts.
11. Use fats and oils in moderation and consume varieties of foods to get a good proportion of all fatty acids for optimal health benefits.
12. Slow and steady reduction in body weight is advisable.
13. Encourage regular physical activity.
14. Cut down sugar, salt, fatty foods, refined foods, soft drinks, and alcohol.
15. Eat complex carbohydrates, low glycaemic foods, and fibre-rich diet.

16. Increase consumption of fruits and vegetables, legumes, whole grains, and nuts.
17. Limit fat intake and shift from saturated to unsaturated fats.
18. Avoid trans-fatty-rich foods (vanaspati, bakery products, and sweets).
19. Use low-fat milk.
20. A minimum 30–45 minutes brisk walk/physical activity of moderate intensity improves overall health.
21. Include ‘warm-up’ and ‘cool-down’ periods, before and after the exercise regimen.
22. Forty-five minutes per day of moderate-intensity physical activity provides many health benefits.
23. Restrict the intake of added salt right from an early age.
24. Develop a taste for foods that are low in salt.
25. Restrict intake of foods such as papads, pickles, sauces, ketchup, salted biscuits, chips, cheese, and salted fish.

Nutrition Information of Some Common Indian Foods

In our fast-paced lifestyle, it is difficult to procure foods that are organic and free from any pesticides. Still, many households do not even have the necessary time to cook food, so they simply order food from hotels/shops. These foods are prepared for commercial purposes and do not care about the healthiness of their preparation, yet people consume them because of the food’s delectable taste.

It is very essential to buy safe & healthy food products and cook them with proper hygienic measures to obtain maximum health benefits. We know that each and every food item has its own nutritional information, but generally, when we refer to the internet, there are so many versions of such information causing confusion.

This section contains **nutritional information of some common foods** that we eat on a day-to-day basis. A total of 60 foods have been hand-picked based on three factors:

- **Procurability:** Easily available all over India
- **Affordability:** Affordable for all income groups
- **Regularity:** Regularly used in Indian homes for cooking

The foods are categorized as follows:

1. **Cereals and Millets:** Ragi, Rice, Wheat
2. **Grain Legumes:** Bengal gram, Black gram, Green gram, Rajmah, Red gram
3. **Vegetables:** Beans, Bitter gourd, Brinjal, Chayote, Cucumber, Drumstick, Ivy gourd, Ladies finger, Peas, Plantain, Pumpkin, Ridge gourd, Spinach, Tomato, Turnip
4. **Roots and Tubers:** Beetroot, Carrot, Potato, Radish
5. **Fruits:** Apple, Banana, Dates, Gooseberry, Grapes, Guava, Lemon, Mango, Orange, Papaya, Pomegranate, Sapota
6. **Condiments and Spices:** Chillies, Coriander, Cumin, Curry leaves, Fenugreek, Garlic, Ginger, Mint, Onion, Pepper, Turmeric
7. **Nuts and Oil Seeds:** Almond, Cashew, Coconut, Groundnut, Flax seeds
8. **Dairy:** Milk
9. **Poultry:** Egg
10. **Animal Meat:** Chicken breast, Red snapper, Sardine

The nutrients are categorized based on the following:

1. **Macronutrients & Energy:** Moisture, Protein, Fat, Carbohydrates, Energy
2. **Vitamins:** Total Vitamin A, Total Vitamin B, Total Vitamin C, Vitamin D2, Vitamin D3, Vitamin E, Vitamin K1, Vitamin K2
3. **Micronutrients (Minerals and Trace Elements):** Calcium, Chromium, Copper, Iron, Magnesium, Manganese, Phosphorous, Potassium, Selenium, Sodium, Zinc
4. **Starch and Sugars:** Total Starch, Total Free Sugars
5. **Fatty Acid Profile:** Total Saturated Fatty Acids (SFA), Mono Unsaturated Fatty Acids (MUFA), Poly Unsaturated Fatty Acids (PUFA), Cholesterol
6. **Saponins:** Total Saponin
7. **Fibre:** Soluble and Insoluble fibres

Nutrients – Functions, Uses, and Their Importance

Nutrient	Functions, Uses, and Importance
Calcium	Deficiency affects nails, hair growth, and skin; essential for neurotransmitter release and muscle contraction; deficiency may lead to seizures.
Carbohydrates	Main energy source. In absence, energy is drawn from fats and proteins, which may result in seizures.
Copper	Deficiency causes connective tissue problems, muscle weakness, anaemia, low WBC count, neurological issues, and paleness.

Curcuminoids	Helpful in treating neurodegenerative diseases like Alzheimer's and Parkinson's. Supports immune function.
Fat	Provides energy, essential fatty acids, and fat-soluble vitamins. Adds flavor, satiety, and palatability.
Fiber	Supports digestion, weight management, and blood sugar regulation. Not digested by the body.
Folate	Important for red blood cell formation. Deficiency causes anaemia; critical during pregnancy to prevent birth defects.
Iron	Essential for oxygen transport (via haemoglobin), muscle metabolism, neurological development, and hormone synthesis.
Lutein	Deficiency linked to low macular pigment density and increased risk of age-related macular degeneration.
Lycopene	Long-term deficiency may increase risk of chronic diseases like heart disease and cancer.
Magnesium	Deficiency leads to tiredness, cramps, abnormal heart rhythm, irritability, low potassium, and tremors.
Manganese	Deficiency can impair bone growth, glucose tolerance, metabolism, fertility, and development.
Phosphorus	Deficiency may cause rickets or osteomalacia; imbalance with calcium can lead to osteoporosis.

Potassium	Deficiency (hypokalaemia) causes fatigue, cramps, numbness, digestive issues, and heart palpitations.
Protein	Essential for muscle mass, enzymes, hormones. Severe deficiency (Kwashiorkor) leads to muscle wasting.
Thiamine (B1)	Deficiency causes Beri Beri (wet: affects heart; dry: affects nerves and muscles).
Vitamin A	Deficiency leads to night blindness (Nyctalopia) and eye dryness (Xerophthalmia).
Vitamin B	Deficiency causes confusion, anaemia, fatigue, and weakened immunity.
Vitamin B3 (Niacin)	Deficiency leads to Pellagra: dermatitis, vomiting, diarrhoea, fatigue, and memory loss.
Vitamin B12	Supports nervous system, red blood cells, and DNA synthesis. Higher bioavailability in dairy; supplements are effective.
Vitamin C	Deficiency causes scurvy: anaemia, fatigue, bleeding, limb pain, gum disease, and tooth loss.
Vitamin D	Synthesized via sunlight; supports calcium absorption, bone health, and immunity.
Vitamin E	Deficiency can cause nerve/muscle damage, vision issues, and weak immunity.

Vitamin K	Essential for blood clotting and bone metabolism via vitamin K-dependent proteins.
Zinc	Deficiency causes growth issues, poor immunity, diarrhoea, delayed maturity, impotence, and skin/eye lesions.