

Chapter - 4

Recommended Dietary Allowances

Learning objectives:

The students will be able to:

- Define the terminologies and concepts used in relation to human nutritional requirements,
- Discuss the concept of recommended dietary allowance,
- State the significance and uses of recommended dietary allowances, and
- Present the current nutrient recommendations for Indian population.

In a family there may be infants, young children, adolescent, adults, and elderly all living under one roof. It is always a big challenge to provide a good nutritious diet for each of the member, particularly when their needs, preferences vary. So what should be the guiding factor to ensure balanced meals that meet the needs of all members? Is there a Standard or a Reference that would serve as a goal for Good Nutrition? This section focuses on this important concept of Recommended Dietary Allowances.

• **RECOMMENDED DIETARY ALLOWANCES: BASIC CONCEPT**

Humans need a wide range of nutrients to lead a healthy and active life. The amount of each nutrient needed for an individual depends on age, body weight, physical activity, physiological state (pregnancy, lactation) etc. So basically the requirement for nutrients varies from individual to individual. So, what do we mean by the term "**Nutrient Requirement**" here?

The requirement for a particular nutrient is the minimum amount that needs to be consumed to prevent symptoms of deficiency and to maintain satisfactory level of the nutrient in the body.

For example in case of infants and children, the requirement may be equated with the amount that will maintain a satisfactory rate of growth and development. Similarly for an adult the nutrient requirement is the amount that will maintain body weight and prevent the depletion of the nutrient from the body which otherwise may lead to deficiency. In physiological condition like pregnancy and lactation, adult women may need additional nutrients to meet the demand of fetal growth along with their own nutrient needs. Now within each group (say infants or an adults etc) there may be individual variations in the nutrient requirements. For instance,

Bioavailability refers to the release of nutrient from the food, its absorption in the intestine and bio-response

there may be a period of low intake or the quality of the diet may vary, similarly the effect of cooking and processing may be different and bioavailability of the nutrient from the diet may also vary.

So how do we account for this? Well a *safety factor* is added over and above the nutrient requirement for each group to arrive at the Recommended Dietary Allowances.

$$\text{REQUIREMENT} + \text{SAFETY MARGIN} = \text{RECOMMENDED DIETARY INTAKE}$$

The Recommended Dietary Allowances (RDA) are the levels of intake of the essential nutrients that are judged to be adequate or sufficient to meet the nutrient requirement of nearly all (97 to 98 percent) healthy individuals in a particular life stage and gender group

From our discussion above it must be clear to you that the Nutrient Requirement of an individual and the Dietary Allowance for a group or a population are distinctly different. RDA takes into account the variability that exists in the requirement of a given nutrient between individuals in a given population group. So RDA is neither minimal requirement nor necessarily optimal level of intake. Rather, RDA is the *safe and adequate level*, which incorporates margin of safety intended to be sufficiently generous (high enough) to encompass the presumed variability in requirements among individuals and meet the needs of almost all healthy people.

Further please note, RDA's do not apply to people who are suffering from disease which influence the nutrient intake. They only apply to healthy people.

Next we shall review the significance, uses of RDA's.

• **SIGNIFICANCE/USES OF RDA**

RDA, we know, represents the level of the nutrient to be consumed daily to meet all the requirements of most of the individuals in a given population. So RDA's help us plan balanced diets which include a variety of foods derived from diverse food groups which help meet the nutrient requirements. Other than this basic use, RDA's have come to serve many important purposes. The various applications of RDA include:

- Comparison of individual intakes to the RDA allows an estimate to be made about the probable risk of deficiency among individuals,
- Modifying nutrient requirements in clinical management of diseases,
- To help public health nutritionists to compose diets for schools, hospitals, prisons etc.
- For health care policy makers and public health nutritionists to design, develop nutrition intervention programmes and policies,

- For planning and procuring food supplies for population groups,
- For evaluating the adequacy of food supplies in meeting national nutritional needs,
- For interpreting food consumption records of individuals and populations,
- For establishing Standards for the national feeding programmes implemented by the Governments for its vulnerable population,
- For designing nutrition education programmes for the masses,

For developing new food products and dietary supplements by the industry,

- Establishing guidelines for the national labeling of packaged foods (by Food Standards Safety Authority of India (FSSAI))

So that was a comprehensive list of uses of RDA. Next let us learn about the Recommended Dietary Allowances for Indians.

• **Recommended Dietary Allowances (RDA) for Indian Population**

For the Indian population, the dietary standards have been computed by the Indian Council of Medical Research (ICMR). These recommendations have been published as "Nutrient Requirements and Recommended Dietary Allowances for Indians" (ICMR 2010)

The recommendations are constantly revised whenever new data is available. The last recommendations were revised in 2010, based on the new guidelines of the International Joint FAO/WHO/UNU Consultative Group and based on the data on Indians that had accumulated after 1989 recommendations. Table 1(a) and Table 1(b) present these recommendations. Study them carefully. To help you understand these recommendation here are a few highlights:

1. Note, the RDA for Indians are presented for the different age categories: 0-6 months, 7 to 12 months, 1 – 3 years, 4 – 6 years, 7 – 9 years, 10 – 12 years, 13 – 15 years, 16 – 18 years, adult man and women..
2. Recommendations are given for energy and all other nutrients including proteins, visible fat, calcium, iron, retinol, Beta Carotene, thiamine, riboflavin etc.
3. Recommended dietary allowances for adults are based on sex (male, female), body weight and physical activity level (i.e. Sedentary, Moderate and Heavy work) .
4. RDA for energy is expressed in kilocalories (Kcal), for proteins, fats in grams (g), and for calcium, iron, vitamins and minerals in milligram (mg) or microgram.
5. RDA for protein is based on body weight. The relationship can be expressed as 1g protein per kg body weight in the case of adults. It varies for other age categories.
6. RDA for energy and protein are given as additional intakes in pregnancy and lactation, indicated by a (" + " sign). This requirement is over and above the normal requirement of adult women. RDA for other nutrients are given as total intake figures.
7. In infancy RDA's for energy, protein, iron, thiamin, riboflavin and niacin are expressed as per kg body weight (expected for a healthy, normal growing infant of a particular age)

8. RDA for Vitamin A have been given in terms of retinol or alternatively in terms of Beta Carotene.

Summary of Recommended Dietary Allowances (RDA) for Energy, Protein, Fat and Minerals for Indians – 2010

Group	Category/Age	Body Weight (kg)	Net Energy (Kcal/d)	Protein (g/d)	Visible Fat (g/d)	Calcium (mg/d)	Iron (mg/d)	Zinc (mg/d)	Magnesium (mg/d)
Men	Sedentary work	60	2320	60.0	25	600	17	12	340
	Moderate work		2730						
	Heavy work		3490						
Women	Sedentary work	55	1900	55	20	600	21	10	310
	Moderate work		2230						
	Heavy work		2850						
	Pregnant		+ 350						
	Lactating 0-6 m		+ 600						
	6-12 m		+520		30		21		
Infants	0-6 months	5.4	92 kcal/kg/d	1.16 g/kg/d	-	500	46 ug/kg/d	-	30
	6-12 months	8.4	80 kcal/kg/d	1.69 g/kg/d	19		05	-	45
Children	1-3 years	12.9	1060	16.7	17		09	5	50
	4-6 years	18.0	1350	20.1	25	600	13	7	70
	7-9 years	25.1	1690	29.5	30		16	8	100
Boys	10-12 years	34.3	2190	39.9	35	800	21	9	120
	10-12 years	35.0	2010	40.4	35	800	27	9	160
Boys	13-15 years	47.6	2750	54.3	45	800	32	11	165
	13-15 years	46.6	2330	51.9	40	800	27	11	210
Boys	16-17 years	55.4	3020	61.5	50	800	28	12	195
	16-17 years	52.1	2440	55.5	35	800	26	12	235

Table 4(a) : Recommended Dietary Allowances for Indians (Vitamins)

Group	Category/Age	Body Weight (kg)	Vitamin A (µg/d)		Thiamine (mg/d)	Riboflavin (mg/d)	Niacin equivalent (mg/d)	Vitamin B ₆ (mg/d)	Ascorbic Acid (mg/d)	Dietary Folate (µg/d)	Vitamin B ₁₂ (µg/d)
			Retinol	Beta-carotene							
Men	Sedentary work	60	600	4800	1.2	1.4	16	2.0	40	200	1.0
	Moderate work				1.4	1.6	18				
	Heavy work				1.7	2.1	21				
Women	Sedentary work	55	600	4800	1.0	1.1	12	2.0	40	200	1.0
	Moderate work				1.1	1.3	14				
	Heavy work				1.4	1.7	16				
	Pregnant	800	6400	+0.2	+0.3	+2	2.5	60	500	1.2	
	Lactating 0-6 months	950	7600	+0.3	+0.4	+4	2.5	80	300	1.5	
	6-12 months			+0.2	+0.3	+3	2.5				
Infants	0-6 months	5.4	350	2800	0.2	0.3	710 µg/kg	0.1	25	25	0.2
	6-12 months	8.4			0.3	0.4	650 µg/kg	0.4			
Children	1-3 years	12.9	400	3200	0.5	0.6	8	0.9	40	80	0.2-1.0
	4-6 years	18.0			0.7	0.8	11	0.9		100	
	7-9 years	25.1	600	4800	0.8	1.0	13	1.6		120	
Boys	10-12 years	34.3	600	4800	1.1	1.3	15	1.6	40	140	0.2-1.0
Girls	10-12 years	35.0			1.0	1.2	13	1.6			
Boys	13-15 years	47.6			1.4	1.6	16	2.0	40	150	0.2-1.0
Girls	13-15 years	46.6			1.2	1.4	14	2.0			
Boys	16-17 years	55.4			1.5	1.8	17	2.0	40	200	0.2-1.0
Girls	16-17 years	52.1			1.0	1.2	14	2.0			

**Source: Nutrient Requirements and Recommended Dietary Allowances for Indians
(ICMR 2010)**

Now that we have a fair good idea about recommended dietary allowances surely you should be able to recommend what individuals should eat and in what amounts to ensure a balanced diet. Off course knowledge of nutrients and the rich food sources of these nutrients will form the basis for diet planning. The amount of different foods to be consumed would depend on the RDA. Higher the RDA for a particular nutrient, the more should be the consumption of food rich in that nutrient. For example, we learnt that the RDA for energy for a heavy worker (adult male) is more as compared to a sedentary male adult. To meet these increased high needs of energy we must ensure that we include more of carbohydrates and fat rich foods in the diet of the heavy adult worker. Carbohydrate rich foods such as cereals, sugars, roots and tubers and fat from oils, butter, ghee etc. will help meet the increased energy requirement.

Similarly in case of infants (6-12 months of age) when the protein needs are high (1.69 g/kg body weight/d) as compared to adults (1g/kg body wt) it would be recommended that high protein rich foods such as milk and milk products, pulses, meat and meat products may be included in the diet of the infants. A detailed review on planning balanced diet is covered in another unit.