FINAL DRAFT

NUTRIENT REQUIREMENTS
AND
RECOMMENDED DIETARY ALLOWANCES
FOR INDIANS

RDA 2010 DRAFT DOCUMENT

A Report of the Expert Group of the
Indian Council of Medical Research
2009

NATIONAL INSTITUTE OF NUTRITION

Indian Council of Medical Research

Jamai-Osmania PO, Hyderabad – 500 604

INTRODUCTORY REMARKS OF THE CHAIRMAN

I wish to welcome the Members and Resource Persons of the 6th ICMR Expert Group who have gathered to revise and update our knowledge on the human nutrient requirements and recommend the dietary allowances (RDA) for Indians, based on their dietary style and composition.

The first Recommendations on safe dietary intake by Indians were made in 1944 by the Nutrition Advisory Committee of Indian Research Fund Association (IRFA) (now ICMR). It was based on Recommendations of the Health Committee of League of Nations in 1937 for desirable safe dietary intakes of nutrients for human health adapted to Indian dietary habits and body weights of Indians of different ages.

As our knowledge about human nutrient requirements improved, ICMR Nutrition Advisory Committee revised RDA for Indians on calories and proteins in 1960. In 1968, another Expert Group constituted by the ICMR revised nutrient requirement and RDA for Indians in respect of all nutrients except calorie. Such a revision and updating of the nutrient requirement on RDA of Indians was done by Expert Groups of the ICMR in 1978 and 1988. While revising and updating nutrient requirement and RDA, the Expert Groups had based their recommendations on the knowledge generated by Indian Research and on International Reports especially by FAO, WHO and UNU.

Since 1990, there has been newer information generated by international research, updated and more precise approaches adopted in assessing human nutrient requirement and dietary intakes and covering newer nutrients, which have not been considered hitherto. This is high time that we should revise and update nutrient requirement and desirable dietary intakes of Indians.

RDA 2010 DRAFT DOCUMENT

Based on newer developments on human nutrient requirements reported internationally and some Indian research reported for the last two decades, some of expert group members and resource persons from National Institute of Nutrition (NIN), after discussions at the meeting convened by the Director, NIN and the Secretary of the Expert Group, prepared a Draft Report on RDA of all nutrients including some of the newer nutrients, dietary components like selenium, B_6 and dietary fibre and antioxidants according to normal procedure. You have all had an opportunity to go through this Draft Report in advance. If you have any specific comments on conclusions drawn on nutrient requirements of Indians and RDA, you can present them at the group for discussion and we can draw our conclusions on the requirements of different nutrients and thus, help in finalizing the Reports and Recommendations on Dietary Intakes made therein.

It is important to draw precise conclusions on Nutrient Requirements and Recommended Dietary Intakes of Indians. This will form a basis for several national activities related to Food and Nutrition like (a) fixing minimum wages of workers by the Planning Commission (b) Planning food production though agriculture (c) Planning import of food to meet the food needs of our population, etc.

I look forward to a useful and knowledgeable discussion.

Thank you!

B. S. Narasinga Rao
Chairman

RDA 2010 DRAFT DOCUMENT

PREAMBLE

The Indian Council of Medical Research constituted an Expert Group in 2008 to revise and update the nutrient requirements and dietary allowances for Indians. This is indeed the Sixth Expert Group constituted by the ICMR. The last Group was constituted in 1988 to update and revise the nutrient requirements and dietary allowances of Indians. The list of the members of the present Group is given in the Appendix.

Besides members of the Expert Group, several Resource Persons both from outside and within the National Institute of Nutrition (NIN) were invited to participate. A list of Resource Persons is also given in the Appendix.

The Expert Group met at the NIN on 28-29 of April 2009. Dr. B. S. Narasinga Rao, the former Director of NIN chaired the meeting and conducted its deliberations. The members of the Expert Group and Resource Persons had been requested to submit background papers on requirement and safe intakes of different nutrients related to their expertise. A background document on different nutrients was prepared by some of the Expert Group members and Resource Persons mostly from the NIN including the Principal Coordinator and the Chairman. The major contribution from Dr.B.Sivakumar, former Director, NIN and Principal Coordinator of the Expert Group in preparing this Draft Report should be gratefully acknowledged.

This Draft Report was based on (a) background papers submitted by the Expert Group members and Resource Persons; (b) newer reports on Human Nutrient Requirements and RDA by UK, USA, European countries and international reports by FAO, WHO and UNU Expert Consultations on Energy, Proteins and Vitamins and mineral requirements of humans. These reports of newer consultations not only included newer aspects of major nutrients like energy and proteins, but also emphasized on a few trace minerals like zinc and selenium and newer dietary components like dietary

RDA 2010 DRAFT DOCUMENT

fibre and antioxidants which were not considered in the previous recommendations. These developments in human nutrient requirements after 1990, as adapted to Indian normal subjects with different body weights were incorporated into the Draft Report which was finalized after a thorough scrutiny by the Chairman and the members of the expert group.

This Draft Report was circulated to the Expert Group members and the Resource Persons well in advance of the meeting for them to go through and come out with their specific comments on the nutrients included. Each nutrient was considered one by one at the Expert Group meeting for discussing the specific comments of the members of the Expert Group and Resource Persons. In the light of newer developments that are published in FAO/WHO/UNU Reports and background information available, Requirements and recommended dietary allowance (RDA) of each nutrient for Indians of different age and physiological groups were derived.

RDA 2010 DRAFT DOCUMENT

and Orissa. Over 50% women (particularly pregnant women) and children suffer from iron deficiency anaemia (IDA), aggravated by helminthic infections. Though blindness due to vitamin A deficiency has become rare, a recent survey shows that milder grades of deficiency as judged by clinical signs like night blindness and Bitot spots and low serum vitamin A levels, are common (1.9). Deficiencies of other micronutrients like some B-complex vitamins particularly riboflavin, folic acid and perhaps vitamin B_{12} are also common. Rickets has become rare, but recent studies from North and South India show that vitamin D deficiency as judged by serum levels of 25-hydroxy vitamin D_2 exists in adults. This, besides low intake of calcium, may be responsible for the high prevalence of osteoporosis particularly in women. Currently, ICMR is conducting a Task Force Study on Prevalence of Osteoporosis in India. The problem of severe forms of Iodine Deficiency Disease (IDD) (an environmental problem) has been considerably reduced after the introduction of universal iodised salt. However due to implementation infirmities, milder forms of IDD persist in many districts. Presence of goitrogens in foods may also contribute to IDD. For every frank case of nutrition deficiency, there are dozens of others who suffer from sub-clinical malnutrition.

REVISION OF HUMAN NUTRIENT REQUIREMENTS

In the wake of Reports by the Food and Agriculture Organization (FAO) on calorie (1.10, 1.11) and protein (1.12) in 1950 and 1957 respectively, an attempt was made by the ICMR in 1958 through its Nutrition Advisory Committee (NAC) to revise protein and calorie requirements of Indians, based on data available at that time (1.13). In 1968, the requirements of all nutrients except energy were reviewed by an Expert Committee constituted by ICMR (1.14). In arriving at these new recommendations, the international data provided by the FAO/WHO Expert Group and those generated by then in India, were used. In 1978, the Recommended Dietary Allowances (RDA) for Indians was again reviewed by another Expert Group of the ICMR and RDAs of several nutrients were revised (1.15). In the recommendations made by the ICMR Expert Group in 1968 and 1978, a

RDA 2010 DRAFT DOCUMENT

wide range of balanced diets for different age and sex groups were formulated which, if consumed, could ensure a daily intake of all nutrients at the recommended levels.

The recommendations on human protein and energy requirements were again revised by a Joint Expert Group of FAO, WHO and United Nations University (UNU) in 1985 (1.16). In arriving at human energy requirement, this International Expert Group followed an entirely new set of guidelines.

Energy allowances for Indians, which were recommended in 1958, had not been revised till 1988. In 1988, an Expert Group was constituted by the ICMR. This Indian Expert Group, while following the new guidelines of the Joint FAO/WHO/UNU Consultative Group of 1985(1.16), also considered the updated data on Indians that had accumulated after 1973 (1.17), to define the energy and protein requirements of Indians. This Expert Group also defined the requirement of other nutrients like fat, vitamin D and vitamin A. No changes were, however, made in the recommendations on the requirement of B-complex vitamins, iron and calcium. This Expert Group included in its recommendations several additional nutrients such as dietary fibre, electrolytes, phosphorus, vitamin E and vitamin K or dietary factors not considered by the earlier ICMR Expert Committees and made provisional recommendations on their desirable intakes to maintain good health. Dietary fat requirements were examined in greater detail and recommendations regarding the requirement in terms of invisible and visible fat were made (1.18). The reference body weights of normal healthy adult man, woman and children were also altered based on body weight data on healthy normal adults and children then obtained by National Institute of Nutrition (NIN) (1.19, 1.20).

The FAO/WHO/UNU Expert Consultation considered the revision of human nutrient requirements again after 2000. One Committee revised the micronutrients requirement in 2001 (1.21) and energy in 2004 (1.22) and protein in 2007 (1.23). In its revision, the International Expert group considered several other micronutrient requirements of humans. The energy requirement, particularly of children 1-10 years was based on stable

RDA 2010 DRAFT DOCUMENT

oxygen use and energy requirement of adults was guided by widespread prevalence of overweight and obesity in the west. In case of proteins, requirement of indispensable amino acids (IAA) was discussed in greater detail and RDA for IAA were also included.

It is more than 15 years since nutrient requirements and RDA were recommended for Indians. In the meantime, there has been much change in the concept of human energy requirements based on actual measurements (double isotopic ratio methods) and the requirement of several micronutrients has also been reconsidered in the recent past. In view of these international developments, ICMR constituted an Expert Group to revise and upgrade the earlier Recommended Dietary Allowances (RDA) of nutrients for Indians. Since human nutrient requirements and RDA have been modified at the international level by the consultations of FAO/WHO/UNU and by the National Committees in US and UK, it is necessary to be up-to-date and examine the need for revision of nutrient requirements and RDA of Indians.

RDA 2010 DRAFT DOCUMENT