Original Article

Recommended Dietary Allowances harmonization in Southeast Asia

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Issues and opportunities for RDA harmonization within the SEA region were first raised during the First Regional Forum and Workshop "RDAs: Scientific Basis and Future Directions", held in Singapore in March 1997. A regional review on RDAs in SEA showed general similarities for the different RDAs, although in some cases a country listed an exceptionally high or low RDA for a particular nutrient for a specific group. It also revealed differences in physiologic groupings and reference body weights, nutrients included and units of expression. Realizing these differences in RDA components between countries which makes technical composition different, a consensus on the need for regional collaboration and harmonization of RDAs was reached by participants from Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. A follow-up workshop was organized to work towards agreement throughout the region on common approaches, concepts and terminologies; application and uses, format and a research agenda. Round table discussions were held to arrive at specific recommendations for achieving harmonization. While divergence in opinions were expected, some clear-cut agreements were settled. Globalization envisions to achieve economic growth and development, with the effects expected to ripple through health, nutrition and welfare improvements. The harmonization of RDAs in SEA seeks to reach this vision by strengthening R and D capabilities (both logistic and manpower) within the region and within the countries in the region, as well as harmonizing the efforts of governments and industry within the region to reduce potential trade barriers such as those relating to food and nutrition quality assurance standards.

Key Words: Recommended Nutrient Intakes (RNI), Recommended dietary intake (RDA), Philippines

BACKGROUND

In March 1997, the International Life Sciences Institute Southeast Asia Region (ILSI SEAR) held the first Regional Forum and Workshop on Recommended Dietary Allowances (RDA) in Singapore to exchange information on the status of RDAs of the countries in the region. In that meeting attended by participants from Indonesia, Malaysia, Philippines, Thailand and Vietnam, and other food and nutrition scientists from the region, discussions focused on the scientific basis for RDAs, on identifying research needs and setting future directions. It was during this forum that the need for regional collaboration and harmonization of RDAs in the region to help bridge efforts between and among countries and governments in facilitating consumer education and public health improvement was recognized. A consensus was then reached for a follow-up seminar-workshop to be organized to move towards agreement throughout the region on common approaches, concepts and terminologies; application and uses; framework (age groupings and reference body weights, core nutrients); and a research agenda.

During the first follow-up Workshop in Kuala Lumpur in 1998 the framework for RDA harmonization was agreed upon. Initial agreements and recommendations reached then included, the purpose and definition of harmonization as "the consensus on certain elements of the RDA for the purpose of obtaining a better understanding not only of the RDAs in various countries but also of their application and use as practiced thereat." The sharing of resources (manpower and materials), through training visits and analysis of food and biological samples, was identified as one strategy to facilitate RDA database generation in the region. An Ad Hoc Committee with membership from local/national RDA Committees of the participating Southeast Asian countries, namely, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, was formed. It was agreed to conduct an inventory survey of the countries' expertise and resources for RDA formulation to serve as basis for identifying Country Focal Points and for drawing up a Plan of Action for regional collaboration toward RDA-SEA harmonization.

The survey that followed showed that there were similarities that could forge immediate harmonization or even alignment in some areas, as well as differences that could be resolved in due time with good science forged by proper research and development.

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After a series of workshops, made possible through the consistent and persevering efforts of ILSI-SEAR, coupled with the able support and assistance of the Food and Agriculture Organization, inspiring the cooperation and united efforts of the members, a number of other agreements were reached, including definition of RDAs for the region, minimum list of nutrients to be included, population groupings and reference body weights. It was further agreed that State-of-the-Art papers be prepared which can serve as the working document for formulating the Recommended Dietary Allowances for the SEA population.

DEVELOPMENT OF RDAS FOR SOUTHEAST ASIA

The formulation of the SEA-RDAs was undertaken by the SEA-RDA Committee, composed of country representatives who are either members of their national RDA Committees or are involved in the review and revision of their respective countries' RDAs, as data generators or users.

The agreements of the Committee included:

(1) the purpose and definition of harmonization as "the consensus on certain elements of the RDA for the purpose of obtaining a better understanding not only of the RDAs in various countries but also of their application and use as practiced thereat"; and

(2) the framework for the harmonized SEA-RDAs, their applications and uses. Agreements on the framework covered: (a) the adoption of population groupings of the Joint FAO/WHO Expert Consultation on Human Vitamin and Mineral Requirements; [1] (b) the selection of "core nutrients" as those considered of nutritional importance to the population in the region (other nutrients may be added to national RDAs); and (c) the setting of reference body weights for each population group, but each country may use, if available, national data derived from national surveys to incorporate trends in body weight within the country.

The state-of-the-art papers on specific core nutrient(s) were prepared by designated SEA-RDA Committee members, detailing the characteristics and functions of energy and specific nutrient; its absorption, utilization and excretion; effects of its deficiency and excess; food sources and usual intakes; factors affecting requirements; estimating procedure for requirements and allowances; current RDAs for the nutrient in the SEA region; the proposed SEA-RDAs; and research recommendations. The papers were viewed as excellent collaborative inputs toward stimulating joint review/study of current concepts in RDA development, use and application of these concepts, as well as initiating the practice of database-sharing, building upon what is available at the national/regional level, and identifying areas for possible future cooperative efforts.

In view of the limited studies done in most SEAsian countries, the Committee drew heavily on the external information sources, namely: (a) the Report of a Joint FAO/WHO Expert Consultation on Human Vitamin and Mineral Requirements[1]; (b) the Report of a Joint FAO/WHO/UNU Expert Consultation on Energy and Protein Requirements[2]; (c) the Report of a Joint FAO/WHO/UNU Expert Consultation on Human Energy Requirements[3]; and (d) the series of Reports on the harmonized US and Canada Dietary Reference Intakes (DRIs) for vitamins and minerals.[4-8] The databases thereof derived from experimental and epidemiological studies, together with other relevant studies published in refereed and non-refereed journals, as well as unpublished data in the region, particularly on nutrient requirements and bioavailability, nutritional status assessment and supplementation studies, were examined. Commonalities of findings in the SEAsian countries or in the region, were given priority importance, followed by the recommendations of FAO/WHO and US and Canada initiatives.

The SEA-RDA Committee follow-up meetings discussed these state-of-the-art papers and consensus was reached on the SEA-RDAs for energy and the various nutrients. The final output is a Monograph, which the ILSI-SEA hopes will be a useful reference/guide on energy and nutrient intakes, for the regional and global scientific community, the health professional, and the industry.

CONCEPTS AND GENERAL PRINCIPLES

The uses and applications of the SEA-RDAs are: (a) assessment of food and nutrient intakes of populations and individuals; (b) planning of nutrient intakes, such as in menu planning, food and nutrient supplementation; (c) assessment of risk to inadequacy of energy and nutrient intakes of individuals/population groups; (d) nutrition education; (e) planning and assessment of food supply; and (f) basis for food product formulation and nutrition information. For labeling purposes, however, the CODEX guidelines will be followed.

The set of SEA-RDAs is defined as "the levels of intake of energy and dietary components which, on the basis of current scientific knowledge, are considered adequate for the maintenance of health and well-being of nearly all healthy persons in the population." The SEA-RDA for a nutrient refers to the daily intake which meets the requirement of almost all apparently healthy individuals in an age- and sex-specific population group. Operationally, it is equivalent to the mean requirement plus two standard deviations, to cover the needs of almost all (97.5%) individuals in a population. For energy, the RDA is set at the average requirement of the individuals in a population group, unlike the RDA for a nutrient which is set at the top of the distribution of requirements (average requirement + 2SD) to meet the needs of nearly all (97.5%) individuals in a specific population group. For some nutrients, the "RDA" is a recommended safe or adequate intake, for lack of sufficient scientific evidence to estimate an average requirement or for the uncertainties in deriving the recommended intake level. This recommended safe or adequate intake level corresponds to the observed average or experimentally set intake for a specific population or subgroup that appears to sustain a defined nutritional status, such as growth rate, normal circulating nutrient levels, or other functional indicators of health. The SEA-RDA is equivalent to the Recommended Nutrient Intake (RNI) as used by the FAO/WHO Report on Human Vitamin and Mineral Requirements.

Energy and the following core nutrients have SEA-RDAs: protein, calcium, iron, iodine, selenium, zinc, vitamins A, C, D, thiamin, riboflavin, niacin, and folate. The divergence among the current RDAs of the SEAsian countries in terms of groupings by age, sex, and physiologic state was resolved, to achieve consistency, by having age categories follow those of the FAO/WHO for vitamins and mineral requirements[1], except that the SEA-RDAs have sub-categories for adolescents and adults to include energy and protein requirements for these groups. The reference weights are 60 kg for adult males, and 50 kg for adult females based on average weights reported by some countries that conducted national surveys between 1998 and 2002. The reference body weights for infants and children up to 9 years old are based on the 50th percentile of the NCHS weight-for-age for males. The reference body weights for older children lie between those of children, 7-9 years old, and those of young adults.

The SEA-RDAs also provide information on "upper tolerable intake level" (UL), defined as the maximum intake from food that is unlikely to pose risk of adverse effects from any excessive intake, e.g. from the growing practice of fortifying foods with nutrients and the increasing use of large doses of dietary supplements. After all, there is no established benefit for healthy individuals, from consuming amounts of nutrients that exceed the RDA.

For most nutrients, the RDAs for infants, from birth to less than 6 months, were derived from adequate intakes of fully breast-fed infants; for older infants, 6 to 12 months, the RDAs include the amounts provided in both breast milk and complementary food.

Most requirement estimates are based on studies on adults. The basis and criteria for assessing adequacy for energy and nutrient intakes are described in detail in the monograph. In general, the requirements for children were extrapolated from those of adults. The additional recommended nutrient intakes during pregnancy were based on the amounts of nutrients laid down in fetal and maternal tissues, plus adjustment for efficiency of conversion in the tissues. For lactating women, the recommendation was based on amounts secreted in breast milk (750 mL for the first 6 months and 600 mL for the second 6 months, multiplied by the nutrient concentration), plus adjustment for efficiency of conversion in the milk. The RDAs during pregnancy and lactation were derived by adding the estimated additional requirements to the recommended intakes of non-pregnant, non-lactating woman. The final RDAs are expressed in terms of usual intakes of nutrients that population groups should consume over a period of time.

The process of developing and establishing the harmonized RDAs, as well as the state-of-the-art papers on 14 selected core nutrients prepared by several country representatives are documented in the monograph published by the International Life Sciences Southeast Asia region (ILSI-SEA).[9] The recommended RDAs for energy, protein, 7 vitamins and 5 minerals for the Southeast Asian population are summarized in the Appendix. The Monograph serves as a working document and reference for countries in the region that are formulating or revising their national RDAs. It is hope that it will also provide a useful and up-to-date information on nutrient intakes to the regional and global scientific community, health professionals and industry.

Harmonization is complicated by the different philosophical bases of the various dietary standards and differing terms such as RDA and RNI for essentially the same standard. In addition, there are differences in age groups, the size of reference individuals and other factors. Although there are practical problems, harmonization, at the minimum, agreeing on a set of nutrient allowances for the region, will strengthen commonalities and similarities or reduce differences in directions and scope of efforts of governments and industry to current efforts to facilitate consumer education and public heath improvement for optimum well-being of all populations in the region.

AUTHOR DISCLOSURES

Corazon VC Barba and Ma Isabel Z Cabrera, no conflicts of interest.

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APPENDIX

RECOMMENDED DIETARY ALLOWANCES FOR SOUTHEAST ASIA (SEA-RDAs)

Population Groups	Weight (kg)	ENERGY (kcal/day)	PROTEIN (g/day)			CALCIUM (mg/day)	IRON (mg/day)		ZINC (mg/day)
			High Quality Protein Diet	Adjusted for 80% Protein Quality	Adjusted for 70% Protein Quality		7.5% Bioavailability	10% Bioavailability	Moderate Bioavailability
Infants (months)									
0 - 5	6	555	11	-	-	300 [a], 400 [b]	0.93 [a]	0.93 [a]	1.1 [a], 2.9 [b]
6 - 11	9	710	14	-	-	400	12.4	9.3	4.2
Children (years)									
1 - 3	14	1,180	16	20	23	500	7.7	5.8	4.8
4 - 6	20	1,470	21	26	29	600	8.4	6.3	5.7
7 - 9	27	1,825	27	34	39	700	11.9	8.9	6.0
Boys (years)									
10 - 12	34	2,110	34	42	48	1,000	19.5	14.6	6.8
13 - 14	47	2,650	45	56	64	1,000	19.5	14.6	8.9
15	47	2,650	45	56	64	1,000	25.1	18.8	8.9
16 - 18	56	2,980	49	62	71	1,000	25.1	18.8	8.6
Girls (years)									
10 - 12	36	2,010	35	44	50	1,000	18.7 [c], 43.6 [d]	14.0 [c], 32.7 [d]	6.1
13 - 14	45	2,205	41	51	58	1,000	18.7 [c], 43.6 [d]	14.0 [c], 32.7 [d]	7.2
15	45	2,205	41	51	58	1,000	41.3	31.0	7.2
16 - 18	49	2,240	40	50	57	1,000	41.3	31.0	6.8
Men (years)									
19 - 29	60	2,635	48	60	68	700	18.3	13.7	6.5
30 - 49	60	2,525	48	60	68	700	18.3	13.7	6.5
50 - 59	60	2,525	48	60	68	1,000	18.3	13.7	6.5
60 - 65	60	2,240	48	60	68	1,000	18.3	13.7	6.5
> 65	60	2,240	48	60	68	1,000	18.3	13.7	6.5
Women (years)									
19 - 29	50	2,115	40	50	57	700	39.2	29.4	4.4
30 - 49	50	2,065	40	50	57	700	39.2	29.4	4.4
50 - 59	50	2,065	40	50	57	1,000	15.1	11.3	4.4
60 - 65	50	1,720	40	50	57	1,000	15.1	11.3	4.4
> 65	50	1,720	40	50	57	1,000	15.1	11.3	4.4
Pregnancy									
1st trimester	-	-	+ 6	+ 7.5	+ 9	1,000	*	*	5.5
2nd trimester	-	+ 360	+ 6	+ 7.5	+ 9	1,000	*	*	7.0
3rd trimester	-	+ 475	+ 6	+ 7.5	+ 9	1,000	*	*	10.0
Lactation (months)									
1st 6	-	+ 505	+ 16	+ 20	+ 23	1,000	20.0	15.0	9.5 [e], 8.8 [f]
2nd 6	-	+ 675	+ 12	+ 15	+ 17	1,000	20.0	15.0	7.2 [g]

Population Groups	Weight (kg)	IODINE (μg/day)	SELENIUM (mg/day)	VITAMIN A (μg/day)	VITAMIN D (μg/day)	VITAMIN C (mg/day)	THIAMIN (mg/day)	RIBOFLAVIN (mg/day)	NIACIN (mg/day)	FOLATE (μg/day)
Infants (months)										
0 - 5	6	90	6	375	5	25	0.2	0.3	2	80
6 - 11	9	90	10	400	5	35	0.3	0.4	4	80
Children (years)										
1 - 3	14	90	17	400	5	30	0.5	0.5	6	160
4 - 6	20	90	22	450	5	30	0.6	0.6	8	200
7 - 9	27	120	21	500	5	35	0.9	0.9	12	300
Boys (years)										
10 - 12	34	120	32	600	5	65	1.2	1.3	16	400
13 - 15	47	150	32	600	5	65	1.2	1.3	16	400
16 - 18	56	150	32	600	5	65	1.2	1.3	16	400
Girls (years)										
10 - 12	36	120	26	600	5	65	1.1	1.0	16	400
13 - 15	45	150	26	600	5	65	1.1	1.0	16	400
16 - 18	49	150	26	600	5	65	1.1	1.0	16	400
Men (years)										
19 - 49	60	150	34	600	5	70	1.2	1.3	16	400
50 - 65	60	150	34	600	10	70	1.2	1.3	16	400
> 65	60	150	33	600	15	70	1.2	1.3	16	400
Women (years)										
19 - 49	50	150	26	500	5	70	1.1	1.1	14	400
50 - 65	50	150	26	500	10	70	1.1	1.1	14	400
> 65	50	150	25	600	15	70	1.1	1.1	14	400
Pregnancy										
1st trimester		200	26	800	5	80	1.4	1.4	18	600
2nd trimester		200	28	800	5	80	1.4	1.4	18	600
3rd trimester		200	30	800	5	80	1.4	1.4	18	600
Lactation (months)										
1st 6		200	35	850	5	95	1.5	1.6	17	500
2nd 6		200	42	850	5	95	1.5	1.6	17	500

Notes:
[a] *Breast-fed*
[b] *Formula-fed*
[c] *Non-menstruating*
[d] *Menstruating*
[e] *0 - 3 months*
[f] *4 - 6 months*
[g] *7 - 12 months*
* *Iron supplements in tablet form recommended for all pregnant women. In non-anaemic pregnant women, daily supplements of 100 mg of iron (e.g., as ferrous sulphate) given during the second half of pregnancy are adequate. In anaemic women, higher doses are usually required.*