

Current Status of Recommended Dietary Allowances in Southeast Asia: A Regional Overview

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Introduction

This is probably the first time that scientists in Southeast Asia have gathered to discuss in depth the recommended dietary allowances (RDAs) in these countries, their utilization, and future developments. The interaction among scientists in the region should bring about mutual benefits. The presence of experts from the Food and Agriculture Organization/World Health Organization (FAO/WHO) and the United States should provide valuable input of experiences from all over the world and from the country with the most advanced research in nutrient requirements.

It was believed that a situational analysis of the currently available RDAs in the Southeast Asian region could provide useful input for the workshop discussions. This overview attempts to collate and analyze the RDAs in the region for commonalities and differences and to highlight specific and special features. It is hoped that this paper will serve as background information for further deliberations during the workshop and discussion sessions.

For this purpose, RDAs currently in use in the following six Southeast Asian countries were obtained for the review: Indonesia,¹ Malaysia,² Philippines,³ Singapore,⁴ Thailand,⁵ and Vietnam.⁶ In addition, recommendations from WHO/FAO⁷⁻⁹ as well as RDAs used in the United States¹⁰ were included for comparison. Brunei Darussalam uses a combination of several RDAs, especially the Malaysian and British RDAs. Recommendations for the most relevant nutrients in the region—namely, energy, protein, calcium, iron, vitamin A, thiamin, riboflavin, folate, vitamin B₁₂, vitamin C (ascorbic acid), and iodine—are tabulated and compared for the different countries and according to age.

Documentation of the RDAs received were incomplete in most cases, where only the nutrients tabulated were received by the author. The development process or steps and the rationale for the levels of the various recom-

mendations were thus unclear. Some of these aspects, especially with regard to current and future developments in the review of national RDAs, are reported herein by the representatives from various countries.

General Comparisons

The various RDAs have widely differing years of implementation; the oldest is the Malaysian RDA, which was introduced in 1975. Most of the RDAs were introduced in the late 1980s or early 1990s. The Vietnamese RDA was adopted by various sectors in the country and was formally signed by the Minister of Health in September 1996. Indonesia also has high political backing of the RDA, which was officially released as a decree of the Minister of Health in 1994. Several versions of the WHO RDA for specific nutrients are used in this review. The nutrients listed differ widely, but the core group of nutrients is similar; the most common ones are energy, protein, calcium, iron, thiamin, riboflavin, niacin, vitamin A, folate, vitamin B₁₂, and vitamin C. Thailand and the United States also listed requirements for several other micronutrients.

The different RDAs adopted different age groupings, especially from adolescents onward. Indonesia, Malaysia, Philippines, and Thailand refer to adults from 20 years onward; Singapore, Vietnam, the United States, and WHO use 18 years and above. In the RDAs for the United States and Indonesia (female), requirements for adults over 50 years old are separately listed; requirements for adults over 60 years of age are separately listed for Indonesia (male), Singapore, Thailand, and Vietnam. For Malaysia and the Philippines, a cutoff of 70 years is used for older adults. With the exception of Malaysia and Vietnam, the median weight and height for each age group in the RDAs are given.

Comparison of RDAs is complicated by the use of different body weights in different countries. Body weights used in the US RDA are the highest for all age groups in all countries studied. WHO uses a wide range of body weights for each age group. Among the Southeast Asian countries, body weights used also differ considerably for all age groups.

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Energy Requirements

Energy requirement is the subject of extensive studies in various countries in the region. Although undernutrition, including energy intake, is still a concern of large segments of the population in Southeast Asian countries, the problem of energy excess, obesity, and the associated chronic diseases has increased in importance. Recommendations for energy intake therefore dominate the attention of workers in the region. It is necessary to examine the recommendations in relation to the altered lifestyles of those populations.

Recommendations for infants and young children are rather similar in all the RDAs, with the exception of Malay-

sia and the United States, which provide for a marginally higher level of total daily requirement (Table 1) (86–112 kcal for infants and 66–124 kcal for children). However, because the United States uses a higher median body weight, the requirement per kilogram of body weight is similar to that of other countries tabulated, whereas the Malaysian RDA appears to be higher.

Provisions for adolescent boys are higher than those for girls in all RDAs reviewed (1850–3000 and 1700–2350 kcal, respectively). There is also general agreement in all the recommendations for these two groups of subjects. The possible exceptions are again Malaysia and the United States, which provide for higher total intakes per day. The amount recommended per kilogram of body weight for the

Table 1. RDAs in Selected Southeast Asian Countries: Energy

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1985)	USA (1989)
Infants, 0–1								
kcal per day	560–800	784–1064	620–880	700–950	600–800	620–820	700–950	650–850
body weight (kg)	5.5–8.5	7–9.5 ^a	6–9	7–9.5	6–8	7–9.5 ^a	7–9.5	6–9
kcal per kg	102–94	112	103–98	100	100	89–86	100	108–94
Children, 1–9								
kcal per day	1250–1900	1360–2190	1350–1740	1150–2100	1200–1450	1300–1800	1150–2100	1300–2000
body weight (kg)	12–24	11–27 ^a	13–24	11–27	12–22	11–27 ^a	11–27	13–28
kcal per kg	104–79	124–81	104–73	105–78	100–66	118–67	105–78	100–71
Boys, 10–19								
kcal per day	2000–2500	2600–2580	2090–2580	2200–2850	1850–2400	2200–2700	2200–2800	2500–3000
body weight (kg)	30–56	34.5–64 ^a	32–55	34.5–64	29–54	34.5–64 ^a	34.5–64	45–66
kcal per kg	67–45	75–40	65–47	64–45	64–44	64–42	64–44	56–45
Girls, 10–19								
kcal per day	1900–2000	2350–2100	1910–2020	1950–2150	1700–1850	2100–2300	1950–2150	2200
body weight (kg)	35–50	36–54 ^a	35–48	36–54	31–48	36–54 ^a	36–54	46–55
kcal per kg	54–40	65–39	55–42	54–40	55–39	58–42	54–40	48–40
Male, 20–59 ^b								
kcal per day	3000	2530–2020	2570–2090	2950–2900	2800–2750	2700	2650–3250 ^d	2900
body weight (kg)	62	55	56	63.5	58	50–80 ^a	50–80	72–79
kcal per kg	48	46–37	46–37	46	48–47	54–34	53–41	40–37
Male, ≥60 ^c								
kcal per day	2200	1770	1880	2450	2250	2200	2100–2800 ^d	2300
body weight (kg)	62	55	56	63.5	58	50–80 ^a	50–80	77
kcal per kg	35	32	34	39	39	44–28	42–35	30
Female, 20–59 ^b								
kcal per day	2250	2000–1600	1900–1540	2100–2150	2000	2300	2150–2700 ^d	2200
body weight (kg)	54	50	49	54	50	40–75 ^a	40–75	58–63
kcal per kg	42	40–32	39–31	39–40	40	58–31	54–36	38–35
Female, ≥60 ^c								
kcal per day	1850	1400	1390	1900	1850	1800	1850–2500	1900
body weight (kg)	54	50	49	54	50	40–75 ^a	40–75	65
kcal per kg	34	28	28	35	37	45–24	46–33	29
Pregnancy								
1st trimester	+285	+150	+0	+200–285	+300	+0	+200–285	+0
2nd trimester	+285	+350	+300	+200–285	+300	+350	+200–285	+300
3rd trimester	+285	+350	+300	+200–285	+300	+350	+200–285	+300
Lactation								
1st 6 months	+700	+550	+500	+500	+500	+550	+500	+500
2nd 6 months	+500	+0	+500	+500	+500	+0	+500	+500

For adults, only requirements at moderate activity levels are given.

^aBody weights not given by the Malaysian and Vietnamese RDAs but taken from WHO.

^b20–69 years for Malaysia, Philippines; 18–59 years for Singapore, WHO; 19–50 for US RDA.

^c≥70 years for Malaysia, Philippines; >50 years for US RDA.

^dFor men, 30–59 years, at 1.8 basal metabolic rate.

US RDA, however, is rather similar to other countries (45–67 kcal for boys and 39–55 kcal for girls) as it uses a higher median body weight; that for the Malaysian RDA is the highest (40–75 kcal for boys and 39–65 for girls).

All countries have recommended higher daily energy requirements for adult men than for women of the same age group (2000–3000 and 1500–2700 kcal, respectively). All RDAs tabulated have also recommended lower intakes for older individuals (>60 years) than for young adults and higher intakes for males than for females (1800–2800 for older men and 1400–2500 for older women). In terms of kilocalories per kilogram of body weight, levels are rather similar in all countries, although slightly higher values may be noted for Vietnam and WHO with somewhat lower levels for Malaysia and the Philippines.

Provisions have been made for additional energy intake during pregnancy and lactation for all countries. The additional amounts over and above the daily intakes are

rather similar in all countries and range from 200 to 300 kcal per day during pregnancy and around 500 kcal per day during lactation. Some countries, however, do not provide for additional energy intake in the first trimester of pregnancy or it is provided for at a lesser amount. Malaysia and Vietnam do not provide for additional energy intake in the latter half of the lactation period.

Protein Requirements

Protein deficiency has declined in importance for many population groups in countries in the region. All countries, however, continue to place importance on monitoring the protein status of communities and ensuring that recommended requirements are met.

All countries listed a protein requirement after having adjusted for the protein quality of the diet (Table 2). Most Southeast Asian countries used a protein quality or net protein utilization (NPU) of 70, Vietnam used a value of

Table 2. RDAs in Selected Southeast Asian Countries: Protein

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1985)	USA (1989)
Infants, 0–1								
g per day	12–15	16.8–13.3	NS–14	16–18	NS–14	21–23	13–14	13–14
body weight (kg)	5.5–8.5	7–9.5 ^a	6–9	7–9.5	4–8	7–9.5 ^a	7–9.5	6–9
g per kg	2.2–1.8	2.4–1.4	NS–1.6	2.3–1.9	NS–1.8	3.0–2.4	1.9–1.5	2.2–1.6
Children, 1–9								
g per day	23–37	23–35	27–35	19–39	17–26	28–40	13.5–27	16–28 ^b
body weight (kg)	12–24	11–27 ^a	13–24	11–27	12–22	11–27 ^a	11–27	13–28
g per kg	1.9–1.5	2.1–1.3	2.1–1.5	1.7–1.4	1.4–1.2	2.6–1.5	1.2–1.0	1.2–1.0
Boys, 10–19								
g per day	45–66	43–54	45–69	49–80 ^c	34–57	50–65	34–56 ^c	45–59 ^d
body weight (kg)	30–56	34.5–64 ^a	32–55	34.5–64	29–54	34.5–64 ^a	34.5–64	45–66
g per kg	1.5–1.2	1.3–0.8	1.4–1.3	1.4–1.3	1.2–1.1	1.5–1.0	1.0–0.9	1.0–0.9
Girls, 10–19								
g per day	54–62	41–45	49–56	51–66 ^c	37–49	50–60	36–46 ^c	44–46 ^d
body weight (kg)	35–50	36–54 ^a	35–48	36–54	31–48	36–54 ^a	36–54	46–55
g per kg	1.5–1.2	1.1–0.8	1.4–1.2	1.4–1.2	1.2–1.0	1.4–1.1	1.0–0.9	1.0–0.8
Men, ≥20								
g per person	55	45	60	68 ^e	51	60	37.5–60 ^e	58–63 ^f
body weight (kg)	62	55	56	63.5	58	50–80	50–80	72–79
g per kg	0.9	0.8	1.1	1.1	0.9	1.2–0.8	0.8	0.8
Women, ≥20								
g per person	48	37	52	58 ^e	44	55	30–56 ^e	46–50 ^f
body weight (kg)	54	50	49	54	50	40–75	40–75	58–63
g per kg	0.9	0.7	1.1	1.1	0.9	1.4–0.7	0.8	0.8
Pregnancy								
1st trimester	+12	+0	+9	+9	+7	+0	+6	+12
2nd trimester	+12	+13	+9	+9	+7	+15	+6	+12
3rd trimester	+12	+13	+9	+9	+7	+15	+6	+12
Lactation								
1st 6 months	+16	+24	+16	+25	+19	+28	+17.5	+17
2nd 6 months	+12	+0	+12	+19	+14	+0	+13	+14

NS, not specified. Protein quality: NPU = 70 for Malaysia, Philippines, Singapore; protein usage = 60 for Vietnam; digestibility of 85% for Thailand; quality of milk or egg for WHO.

^a Body weights not given by Malaysian and Vietnamese RDAs but taken from WHO.

^b 1–10 years.

^c 10–18 years.

^d 11–18 years.

^e ≥18 years.

^f ≥19 years.

60, and Thailand used a digestibility value of 85%. WHO and the US RDA assume a good quality or reference protein.

All RDAs for children are given in a range—e.g., 12–18 g per day for infants, except for Vietnam, which provides for a higher intake of 21–23 g. For children less than 10 years old and adolescents, higher amounts (23–37 g) are recommended by Indonesia, Malaysia, Philippines, Singapore, and Vietnam. The other three RDAs (Thailand, WHO, and the United States) have lower recommendations, ranging from 13.5 to 28.0. Intake further increases to 43–69 g per day for all countries except Thailand and the United States and WHO, which recommend 34–59 g. For some RDAs, amounts recommended for girls are marginally higher than for boys.

Recommendations for adult women are lower than those for men (37.5–68 versus 37–58 g). There are considerable variations among the recommendations for the various RDAs. WHO and the United States are the only RDAs that give a range for protein requirements. All RDAs recommend additional amounts of protein during pregnancy, ranging from 6 to 15 g per day, most of which is for the duration of the pregnancy. During lactation, higher additional amounts of protein are recommended for all RDAs, with amounts ranging from 12 to 28 g per day.

Based on grams of protein per kilogram of body weight, the recommended protein requirements for WHO and the US RDA for all age groups are very similar and are generally lower than for the other RDAs. There is more variation among other countries, with the RDA for Vietnam providing the highest intakes.

Requirements for Calcium and Iron

Calcium

Documentation of calcium deficiency is much less than for the other nutrients. However, the importance of the problem of osteoporosis, a chronic disorder, has been highlighted in recent years. To determine whether the recom-

mendations are adequate, it is first necessary to determine the extent and severity of the deficiency.

Recommendations for calcium intake for infants were similar for all the RDAs studied. Notable differences are observed for the other age groups, however, and are generally higher for Thailand and the United States. For children and adults, the Thai and US RDAs provide for 300–1200 mg per day, whereas the recommendations for the other countries range from 450 to 700 mg per day. There were no differences in recommendations according to sex (Table 3).

The US RDA does not provide a greater requirement for pregnant and lactating women, but recommendations for adults (800–1200 mg) are higher than in other countries. The additional amounts recommended during pregnancy and lactation in the other countries are similar and range from 400 to 700 mg per day.

Iron

Recommendations for dietary iron intake will continue to be of considerable interest to nutrition workers in the region in view of the continued high prevalence of iron deficiency anaemia, particularly among young children and women of childbearing age.

As expected, recommendations for iron are the highest for adult women (6–28 mg per day) to meet increased needs and decline sharply after 50 years of age to levels similar to those for adult men (6–13 mg per day). The second highest recommendations for iron are for 10- to 19-year-old boys and girls (7–23 mg per day) (Table 4)

No additional amounts are recommended for pregnant women by Malaysia, Singapore, and WHO. Indonesia, Philippines, and Thailand recommend relatively high amounts of 15–41 mg per day, whereas Vietnam recommended only 6 mg per day. During lactation, only Philippines (23 mg per day) and Indonesia (2 mg per day) recommended additional iron intake.

In general, recommendations for Indonesia, Malaysia, Philippines, and Vietnam are higher than those for the

Table 3. RDAs in Selected Southeast Asian Countries: Calcium (mg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1988)	USA (1989)
Infants, 0–1	600–400	550	300–600	500–600	360–480	300–500	500–600	400–600
Children, 1–9	500	450	600	400–500	800	500	400–500	800
Boys, 10–19	700–600	650–500	700	600–500	1200	700	600–700	1200
Girls, 10–19	700–600	650–500	700	600–500	1200	700–600	600–700	1200
Men, ≥20	500	450	500	400–500	800	500	400–500	1200–800
Women, ≥20	500	450	500	400–500	800	500	400–500	1200–800
Pregnancy								
1st trimester	+400	+0	+400	+600–700	+400	+0	+0	+0
2nd trimester	+400	+750	+400	+600–700	+400	+500	+600–700	+0
3rd trimester	+400	+750	+400	+600–700	+400	+500	+600–700	+0
Lactation								
1st 6 months	+400	+750	+400	+600–700	+400	+500	+600–700	+0
2nd 6 months	+400	+0	+400	+600–700	+400	+0	+0	+0

Table 4. RDAs in Selected Southeast Asian Countries: Iron (mg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975) ^a	Philippines (1989) ^b	Singapore (1988) ^c	Thailand (1989)	Vietnam (1996)	WHO (1988) ^d	USA (1989)
Infants, 0–1	3–5	10	10–15	7	6–8	10–11	7	6–10
Children, 1–9	8–10	10	9–12	7	10	6–12	4–8	10
Boys, 10–19	14–23–13	10–18	16–18–17	7–12–6	12–10	12–11	8–12	12
Girls, 10–19	14–25–16	10–28	17–25	7–19	15	12–24	8–13	15
Men, ≥20	13	9	12	6	10	11	8	10
Women, ≥20	26–14	28–9	26–11	19–6	15–10	24–9	14–6	15–10
Pregnancy								
1st trimester	+30	+0	+41	+0	+30	+0	+0	+15
2nd trimester	+30	+0	+41	+0	+30	+6	+0	+15
3rd trimester	+30	+0	+41	+0	+30	+6	+0	+15
Lactation								
1st 6 months	+2	+0	+23	+0	+0	+0	+0	+0
2nd 6 months	+2	+0	+23	+0	+0	+0	+0	+0

^aIron absorption from diet assumed to be 10%.

^bRate of absorption of iron from average Filipino diet is 8.2%.

^cValues apply when 10–25% of energy in diet comes from animal foods.

^dAdequate to prevent development of overt anaemia for intermediate bioavailability diet (10%).

other countries. Most of the RDAs indicate a rate of iron absorption from the diet (usually 10%), which influences the recommended intake.

Recommendations for Several Vitamins

There has been a great deal of interest in the intake of several vitamins in relation to claims for prevention of chronic diseases. The importance of vitamin requirements, particularly the amounts needed, has been the subject of much discussion and controversy. Focus is given to the possible role of vitamins in conditions and diseases beyond their classic functions. This includes the possible role of several vitamins in cancer prevention.

Vitamin A

Considerable differences in recommendations for vitamin A, especially during pregnancy and lactation, are observed. Vitamin A requirements for all countries except the United States ranged from 300 to 700 µg RE per day for

infants to adults. Recommendations in the United States are clearly higher and range from 375 to 1000 µg RE per day (Table 5).

Recommendations for additional retinol during pregnancy are more conservative. Malaysia, Singapore, and the United States do not suggest additional requirements. Indonesia, Thailand, and WHO recommend an additional 100–200 µg RE per day, whereas an additional 25 µg is recommended by the Philippine RDA. All RDAs studied provide for additional amounts of retinol during lactation, in most cases ranging from 275 to 500 µg RE daily throughout the 12-month lactation period.

Thiamin

Recommendations for thiamin are rather similar for all countries, although requirements in the Singapore RDA are marginally lower. Levels recommended for boys and men (0.9–1.5 mg) are marginally higher than for girls and women (0.8–1.1 mg). All countries recommend additional vitamin

Table 5. RDAs in Selected Southeast Asian Countries: Vitamin A (µg RE per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1988)	USA (1989)
Infants, 0–1	350	300	325	300	420–375	325–350	350	375
Children, 1–9	350–400	250–400	350–400	250–400	390–500	400	400	400–700
Boys, 10–19	450–600	575–750	425–525	575–750	600–700	500–600	500–600	1000
Girls, 10–19	500	575–750	400–450	575–750	600	500–600–500	500	800
Men, ≥20	600	750	525	750	700	600	600	1000
Women, ≥20	500	750	450	750	600	500	500	800
Pregnancy								
1st trimester	+200	+0	+25	+0	+200	+0	+100	+0
2nd trimester	+200	+0	+25	+0	+200	+100	+100	+0
3rd trimester	+200	+0	+25	+0	+200	+100	+100	+0
Lactation								
1st 6 months	+350	+450	+325	+450	+400	+300	+350	+500
2nd 6 months	+300	+0	+275	+450	+320	+0	+350	+400

Table 6. RDAs in Selected Southeast Asian Countries: Thiamin (mg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1976)	USA (1989)
Infants, 0–1	0.3–0.4	0.4	0.3–0.4	0.28–0.38	0.3–0.5	0.3–0.4	0.4	0.3–0.4
Children, 1–9	0.5–1.0	0.5–0.9	0.7–0.9	0.46–0.72	0.7–1.2	0.8–1.3	0.5–0.9	0.7–1.0
Boys, 10–19	1.0	1.0	1.0–1.3	0.88–1.14	1.4	1.0–1.2	1.0–1.2 ^a	1.3–1.5
Girls, 10–19	1.0	0.9–0.8	1.0	0.78–0.86	1.1	0.9–1.0–0.9	0.9 ^a	1.1
Men, ≥20	1.2–1.0	1.0–0.8	1.3–0.9	1.18–0.98	1.5–1.2	1.2	1.2 ^b	1.5–1.2
Women, ≥20	1.0	0.8	1.0–0.7	0.84–0.80	1.0	0.9	0.9 ^b	1.1–1.0
Pregnancy								
1st trimester	+0.2	+0	+0	+0.09	+0.4	+0	+0	+0.4
2nd trimester	+0.2	+0.2	+0.3	+0.09	+0.4	+0.2	+0.15	+0.4
3rd trimester	+0.2	+0.2	+0.3	+0.09	+0.4	+0.2	+0.15	+0.4
Lactation								
1st 6 months	+0.3	+0.2	+0.4	+0.2	+0.5	+0.2	0.2	+0.5
2nd 6 months	+0.3	+0	+0.4	+0.2	+0.5	+0	+0	+0.5

^a10–17 years.^b≥18 years.

B₁ during pregnancy (0.1–0.3 mg) and lactation (0.2–0.5 mg) (Table 6).

Riboflavin

Recommendations for riboflavin are generally similar for all the countries. Levels recommended for boys (1.0–1.8 mg) and men (1.0–1.5 mg) are marginally higher than for girls (1.0–1.5 mg) and women (1.0–1.3 mg). An additional 0.2–0.6 mg per day is recommended by all countries for pregnant and lactating women (Table 7).

Folic Acid

On the whole, Malaysia, Singapore, and the United States appear to have made marginally higher recommendations for folic acid than other countries (Table 8).

Recommendations for boys are marginally higher than for girls and those for men are greater than for women. For example, the recommendation for boys may be 90–165 µg per day, whereas 90–145 µg is recommended for girls. Rec-

ommendations for men and women are approximately 190 and 160 µg per day, respectively.

All countries have similar recommendations for pregnancy and lactation. An amount of 150–300 mg per day is recommended for pregnant women and about half that (50–100 µg) is recommended during lactation.

Vitamin B₁₂

There are no recommendations for vitamin B₁₂ intake in the RDAs of Philippines and Vietnam (Table 9). No major differences are observed in recommendations for the requirement for the vitamin in the other RDAs tabulated. In addition, no differences in recommendations are made according to sex. The requirements for adolescents and adults from 10 years and above range from 1.0 to 2.0 µg per day. All countries also provided for additional intake during pregnancy (ranging from 0.2 to 1.0 µg per day) and lactation (0.3–0.6 µg per day).

Table 7. RDAs in Selected Southeast Asian Countries: Riboflavin (mg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1976)	USA (1989)
Infants, 0–1	0.3–0.5	0.6	0.3–0.4	0.42–0.57	0.4–0.6	0.3–0.5	0.5–0.6	0.4–0.5
Children, 1–9	0.6–1.0	0.8–1.3	0.7–0.9	0.69–1.26	0.8–1.4	0.8–1.3	0.8–1.3	0.8–1.2
Boys, 10–19	1.0–1.3	1.6–1.5	1.0–1.3	1.32–1.71	1.6–1.7	1.6–1.8	1.6–1.8 ^a	1.5–1.8
Girls, 10–19	1.0–1.2–1.0	1.4–1.3	1.0	1.17–1.29	1.3	1.4–1.5–1.4	1.5 ^a	1.3
Men, ≥20	1.5–1.2	1.5–1.2	1.3–0.9	1.77–1.47	1.7–1.4	1.8	1.8 ^b	1.7–1.4
Women, ≥20	1.0	1.2	1.0–0.7	1.26–1.20	1.2	1.3	1.3 ^b	1.3–1.2
Pregnancy								
1st trimester	+0.2	+0	+0	+0.15	+0.3	+0	+0	+0.3
2nd trimester	+0.2	+0.2	+0.6	+0.15	+0.3	+0.6	+0.2	+0.3
3rd trimester	+0.2	+0.2	+0.6	+0.15	+0.3	+0.6	+0.2	+0.3
Lactation								
1st 6 months	+0.4	+0.3	+0.4	+0.3	+0.5	+0.4	+0.35	+0.5
2nd 6 months	+0.3	+0	+0.4	+0.3	+0.5	+0	+0	+0.4

^a10–17 years.^b≥18 years.^c11–18 years.^d≥19 years.

Table 8. RDAs in Selected Southeast Asian Countries: Folic Acid (μg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1988)	USA (1989)
Infants, 0–1	22–32	50	20–30	60	20–30	NS	16–32	25–35
Children, 1–9	40–80	100	40–80	100	40–65	NS	50–102 ^a	50–100
Boys, 10–19	90–165	100–200	100–170	100–200	90–165	NS	170 ^b	150–200
Girls, 10–19	100–160	100–200	110–150	100–200	95–145	NS	170	150–180
Men, ≥ 20	190	200	170	200	175	NS	200	200
Women, ≥ 20	160–150	200	150	200	150	NS	170	180
Pregnancy								
1st trimester	+150	+0	+200	+200	+150	NS	+200–300	+220
2nd trimester	+150	+200	+200	+200	+150	NS	+200–300	+220
3rd trimester	+150	+200	+200	+200	+150	NS	+200–300	+220
Lactation								
1st 6 months	+50	+100	+100	+100	+100	NS	+100	+100
2nd 6 months	+40	+0	+100	+100	+100	NS	+100	+80

NS, not specified.

^a1–12 years.^b12–16 years.

>16 years.

Table 9. RDAs in Selected Southeast Asian Countries: Vitamin B₁₂ (μg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1988)	USA (1989)
Infants, 0–1	0.1	0.3	NS	0.3	0.4–0.5	NS	0.1	0.3–0.5
Children, 1–9	0.5–0.9	0.9–1.5	NS	0.9–1.5	0.7–1.3	NS	0.5–0.9	0.7–1.4
Boys, 10–19	1.0	2.0	NS	2.0	2.0	NS	1.0	2.0
Girls, 10–19	1.0	2.0	NS	2.0	2.0	NS	1.0	2.0
Men, ≥ 20	1.0	2.0	NS	2.0	2.0	NS	1.0	2.0
Women, ≥ 20	1.0	2.0	NS	2.0	2.0	NS	1.0	2.0
Pregnancy								
1st trimester	+0.3	+0	NS	+1.0	+0.5	NS	+0.4	+0.2
2nd trimester	+0.3	+1.0	NS	+1.0	+0.5	NS	+0.4	+0.2
3rd trimester	+0.3	+1.0	NS	+1.0	+0.5	NS	+0.4	+0.2
Lactation								
1st 6 months	+0.3	+0.5	NS	+0.5	+0.5	NS	+0.3	+0.6
2nd 6 months	+0.3	+0	NS	+0.5	+0.5	NS	+0.3	+0.6

NS, not specified.

Vitamin C

There is a great deal of interest in RDAs for vitamin C because of claims about the preventive and therapeutic properties of the vitamin. Self-supplementation of the vitamin, often in large doses, is increasing in countries in the region.

Recommendations for Malaysia, Singapore, and WHO are approximately half those proposed by other RDAs for nonpregnant and nonlactating subjects (Table 10). These three RDAs have set requirements ranging from 20 mg per day for infants and young children to 30 mg for adults. For the other countries, requirements have been proposed from 30 mg per day for infants and young children to 75 mg for adults.

All countries recommend additional amounts of vitamin C during pregnancy; the highest amount, 60 mg per day, is suggested for the United States. For the other countries, additional amounts recommended during pregnancy (10–20 mg per day) are much lower. An additional 10–35

mg is also recommended for lactating women in all the RDAs.

Recommendations for Iodine

Iodine deficiency is a concern to many countries in the region, and it afflicts specific communities. Requirements for iodine are recommended only for Philippines, Thailand, and the United States (Table 11). This does not mean that there is a lack of attention to the problem in other countries. There are already intensive intervention programs (e.g., salt iodization) being carried out.

Levels of iodine recommended are very similar, especially for Thai and US RDAs. Recommendations start from 40–50 μg for infants to 55–120 μg for children, 80–150 μg for adolescent boys and girls, and 100–150 μg for adults. An additional 25 μg is recommended during pregnancy, and the amount recommended during lactation is double that.

Table 10. RDAs in Selected Southeast Asian Countries: Vitamin C (mg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1985)	USA (1989)
Infants, 0-1	30-35	20	30	20	35	30	20	30-35
Children, 1-9	40-45	20	35-55	20	45	35-55	20	40-45
Boys, 10-19	50-60	20-30	65-90	20	50-60	65-80	20-30	50-60
Girls, 10-19	50-60	20-30	70-85	20	50-60	70-80	20-30	50-60
Men, ≥20	60	30	75	30	60	75	30	60
Women, ≥20	60	30	70	30	60	70	30	60
Pregnancy								
1st trimester	+10	+0	+10	+20	+20	+0	+0	+60
2nd trimester	+10	+20	+10	+20	+20	+10	+20	+60
3rd trimester	+10	+20	+10	+20	+20	+10	+20	+60
Lactation								
1st 6 months	+25	+20	+35	+20	+40	+30	+20	+35
2nd 6 months	+10	+0	+30	+20	+40	+0	+0	+30

Table 11. RDAs in Selected Southeast Asian Countries: Iodine (µg per day)

Age Group (years)	Indonesia (1994)	Malaysia (1975)	Philippines (1989)	Singapore (1988)	Thailand (1989)	Vietnam (1996)	WHO (1985)	USA (1989)
Infants, 0-1	NS	NS	40-50	NS	40-50	NS	NS	40-50
Children, 1-9	NS	NS	55-70	NS	70-120	NS	NS	70-120
Boys, 10-19	NS	NS	85-120	NS	150	NS	NS	150
Girls, 10-19	NS	NS	80-100	NS	150	NS	NS	150
Men, ≥20	NS	NS	120	NS	150	NS	NS	150
Women, ≥20	NS	NS	100	NS	150	NS	NS	150
Pregnancy								
1st trimester	NS	NS	+0	NS	NS	NS	NS	175
2nd trimester	NS	NS	+25	NS	NS	NS	NS	175
3rd trimester	NS	NS	+25	NS	NS	NS	NS	175
Lactation								
1st 6 months	NS	NS	+50	NS	NS	NS	NS	200
2nd 6 months	NS	NS	+50	NS	NS	NS	NS	200

NS, not specified.

Concluding Remarks

There are general similarities for the different RDAs, although in some cases a country lists an exceptionally high or low RDA for a particular nutrient for a specific group for specific reasons. Examples are energy, protein, calcium, vitamin A, and vitamin C. Requirements for energy are also of concern to countries in the region, especially with the increasing prevalence of overweight among selected segments of the population. With increasing interest in the possible role of vitamins in several chronic diseases, the recommended intakes of these nutrients will certainly be under close scrutiny.

Although documentation is incomplete in most cases, it is thought that RDAs for most countries have not been based on sufficient experimental data. There are no resources and expertise to carry out extensive experimental studies to establish nutrient requirements for various population groups. It is therefore necessary for these countries to continue to make use of data from other countries and adapt them to local situations. There could be closer collaboration and even harmonization in future development of RDAs. With rapidly changing nutrition scenarios in the region, countries also need to regularly review the suit-

ability of recommended requirements.

It would be useful to understand more fully the extent of utilization of RDAs in countries in the region. Questions that may be asked include the extent and proper use of RDAs by nutritionists, dietitians, and doctors as well as by other health workers in research and health promotion activities; by program planners and managers in nutrition intervention programs; and by food scientists and technologists in nutrition labeling. What are the implications of levels of recommendations in RDAs on health programs and activities?

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