

Original Article

Vietnam Recommended Dietary Allowances 2007

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It has been well acknowledged that Vietnam is undergoing a nutrition transition. With a rapid change in the country's reform and economic growth, food supply at the macronutrient level has improved. Changes of the Vietnamese diet include significantly more foods of animal origin, and an increase of fat/oils, and ripe fruits. Consequently, nutritional problems in Vietnam now include not only malnutrition but also overweight/obesity, metabolic syndrome and other chronic diseases related to nutrition and lifestyles. The recognition of these shifts, which is also associated with morbidity and mortality, was a major factor in the need to review and update the Recommended Dietary Allowances (RDA) for the Vietnamese population. This revised RDA established an important science-based tool for evaluation of nutrition adequacy, for teaching, and for scientific communications within Vietnam. It is expected that the 2007 Vietnam RDA and its conversion to food-based dietary guidelines will facilitate education to the public, as well as the policy implementation of programs for prevention of non-communicable chronic diseases and addressing the double burden of both under and over nutrition.

Key Words: Vietnam, Dietary recommendation, Nutritional requirement, Energy intake, Protein intake

INTRODUCTION

The National Institute of Nutrition (NIN) under Ministry of Health was established by the Vietnamese government in 1980. The NIN has the lead responsibility for research, training and implementation activities in the field of nutrition, food sciences, food safety, and clinical nutrition in Vietnam. In Vietnam, Recommended Dietary Allowances (RDA) for energy and specific nutrients were first officially approved by Ministry of Health, Vietnam in 1996. On 31 July 2007, the Minister of Health, Vietnam approved the 2007 Vietnam RDA. This revised RDA will be an important science-based tool for evaluation of nutrition adequacy, for teaching, and for scientific communications within Vietnam.

CURRENT FOOD, HEALTH AND NUTRITION SITUATION IN VIETNAM

Over the past decade, the structure of the Vietnamese economy has undergone major changes. The industrial and service growth has resulted in a remarkable increase in the gross domestic product (GDP). The rapid economic growth has led to urbanization in all parts of the countries, with immigrants accounting for 30% of the urban population.

Mortality, morbidity patterns

The associated cause of morbidity and mortality has been modified in Vietnam over the past 30 years, especially during the last decade (Table 1).¹ In 1996, a larger proportion of the total mortality and morbidity burden was due to communicable diseases while in 2005, a larger proportion of mortality and morbidity burden was due to non-communicable diseases.² Dietary and physical activity habits also changed. Currently, nutri-

tional problems in Vietnam include not only malnutrition but also an increasing prevalence of overweight, obesity, metabolic syndrome and other chronic diseases related to nutrition and lifestyles. The recognition of the shifts in association with morbidity and mortality was a major factor in the need to review and to update the RDA for the Vietnamese population.

Situation of food supply

Advances in agriculture production have contributed greatly to national food security and the GDP. According to the General Statistics Office, total rice production increased from 27.5 million tons in 1997 to 32 million tons in 2001 and 35.7 million tons in 2005. The production of other kinds of foods such as maize, cassava, peanuts and beans also increased. Advances in animal husbandry resulted in increased meat production from 1.59 million tons in 1997 to 1.9 million tons in 2001 and 2.5 million tons in 2005. Fish and seafood production more than doubled from 1.23 million tons in 1997 to 3.4 millions tons in 2005.³

Food consumption

Partly due to urbanization and increased income, the diet of the Vietnamese people has significantly altered. The average diet based on cereal, tuber, and vegetable expanded to include meat, eggs, milk, fat and sugar. However, fish and aqua product consumption is still poor and has not improved since the 1980s.

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Table 1. Percentage of mortality by causes 1976-2005

Causes of death	1976	1986	1996	2002	2005
Due to communicable diseases	53.1	52.1	33.1	18.2	16.5
Due to non-communicable diseases	44.7	41.8	43.7	63.3	61.1
Due to accidents, injuries and poisons	2.2	6.1	23.2	18.5	22.4

Source: Health Statistical Year Book, 2005

Table 2. Requirement for energy by age, physical status and work categories

Gender	Age group/physical status	Energy intake by work categories (kcal/day)		
		Light	Moderate	Heavy
Male	19 – 30	2.300	2.700	3.300
	31 – 60	2.200	2.600	3.200
	> 60	1.900	2.200	2.600
	19 – 30	2200	2.300	2.600
	31 – 60	2.100	2.200	2.500
	> 60	1.800	1.900	2.200
Female	Pregnant women in 3 middle months	+ 360	+ 360	-
	Pregnant women in 3 last months	+ 475	+ 475	-
	Breastfeeding women in good nutritional status	+ 505	+ 505	-
	Breastfeeding women in poor nutritional status	+ 675	+ 675	-

Traditional foods, such as sesame, peanuts, tofu, green vegetables and fish are less important. A proportion of the urban population has embraced fast foods and drinks, as well as animal-based foods and refined carbohydrates (sugars, sweets), representing the most significant phenomenon of the nutritional transition and appears to be related to an increase of income.

Nutritional problems

Protein-energy malnutrition in children remains a large challenge for community health and development in Vietnam. Despite the percentage of malnutrition in Vietnam being reduced by an estimated 34% since 2000 as of 2006, it still is obvious that low birth weight and early malnutrition prevail, especially in poor and underdeveloped regions.⁴ Sub-clinical vitamin A deficiency (by serum vitamin A) still exists, even while universal vitamin A supplementation programs are implemented throughout the country. Although the prevalence of anemia in the general population, it remains high in pregnant women and children. According to a survey in 2006, about 35% pregnant women in suburban are anemic.⁵

Since 1995, overweight and obesity have approached malnutrition as key community health problems. A national survey on overweight and obesity indicated the prevalence at 16.3%, although overweight is more commonly reported than obesity. This survey conducted in 2005 of 620 adults in urban and suburban locations in Hanoi indicated the prevalence of metabolic syndrome at 17.1% in urban and 9.0% in suburban areas.²

High blood pressure with its attendant high morbidity rate has become a health problem. A 1999 survey indicated the prevalence of hypertension in adults living in Hanoi as 16.1%, increasing to 23.1% in 2001.⁶ Stroke

Table 3. Energy intake of children from birth to 18 years

Gender, age group	Energy intake (kcal/day)
Male and female, under 6 months,	555
Male and female, from 7 - 12 months	710
Male and female, 1 - 3 years	1.180
Male and female, 4 - 6 years	1.470
Male and female, 7 - 9 years	1.825
Male Adolescence, 10 - 12 years	2.110
Male Adolescence, 13 - 15 years	2.650
Male Adolescence, 16 - 18 years	2.980
Female Adolescence, 10 - 12 years	2.010
Female Adolescence, 13 - 15 years	2.200
Female Adolescence, 16 - 18 years	2.240

cases have tripled in the past ten years. Coronary vascular disease is six times more prevalent than in the 1960s. Diabetes is on the rise. Studies done in 2002 by the Institute of Endocrinology showed the prevalence of diabetes in urban areas of four major cities to be 4.9%, while the prevalence of impaired glucose tolerance was 5.9%.⁷

2007 VIETNAM RECOMMENDED DIETARY ALLOWANCES

The scientific rationale for the review and development of the 2007 Vietnam Recommended Dietary Allowances was based upon (1) the recommended RDA, approved by the Minister of Health in the Decision No. 1564/BYT-QD, dated September 19, 1996⁸; (2) the recommendations of

Table 4. Protein intake of breastfed infant (*)

Age (month)	Average protein intake (g/kg of weight/day)	
	Male	Female
Under 1 month	2.46	2.39
1-2	1.93	1.93
2-3	1.74	1.78
3-4	1.49	1.53

(*) Presently, as recommendation of WHO/UNICEF, for infant under 6 months of age, breastfeeding ensures total need of protein for the infant to grow and be healthy.

Table 5. Protein intake for children under 10 years of age and adolescence from 10 - 18 years

Age group	Protein intake (g/day)		Demand for animal protein (%)
	Energy intake from prtein =12% -15%, NPU intake = 70%		
Children under 10			
Infant under 6 months	12		100
7 – 12 months	21 - 25		70
1-3 years	35 - 44		≥ 60
4-6 years	44 - 55		≥ 50
7-9 years	55 - 64		≥ 50
Adolescent children (*)			
10 – 12	63 - 74		35-40%
13 – 15	80 - 93		35-40%
16 – 18	89 - 104		35-40%
10 – 12	60 - 70		35-40%
13 – 15	66 - 77		35-40%
16 – 18	67 - 78		35-40%

(*). Calorie intake provided by Protein 12-14%, can reach 16% of total energy

Table 6. Recommended lipid intake by age and physical status

Age group / Physical status	Requirement for lipid / total Energy intake (%)	
	Daily	Maximum
Under 6 months	45 - 50	60
6-11 months	40	60
1-3 years	35 - 40	50
4 to 18 years	20 - 25	30
Male	18 - 25	25
Reproductive aged, pregnant and breastfeeding women	20 - 25	30
Recommended fatty unsaturated acids		
Age group/physical status	Percentage (%) of total calorie intake	
	Acid Linoleic	Acid Alpha-Linoleic
Under 1 year old children	4.5	0.5
1-3 years	3.0	0.5
Children from 4 to 18 years	2.0	0.5
Adults	2.0	0.5
Pregnant and breastfeeding women	2.0	0.5

FAO/WHO in 1985⁹ and WHO in 2003¹⁰, as well as recent references of the RDA South-East Asia Region¹¹; and (3) the observed data from current studies monitoring food intake, nutritional status, and health conditions within Vietnam.^{2,12} In the 2007 Vietnam RDA, some recommendations were introduced for nutrients which had not been included in the 1996 RDA. These new considerations were focused upon fiber, vitamin E, vitamin K, iodine, zinc, selenium, and water. For fiber, the US recommendations (IOM-FNB) were utilized.¹³⁻¹⁵ For vitamin E, vitamin K, iodine, zinc, selenium, and water, the recommendations of FAO/WHO (2002) and of the region

(SEA-RDAs 2005) were followed. For macronutrients, it was recommended that carbohydrate should account for 61-70% of total calorie, and fat should not exceed 25% of total energy intake. The recommended intake of dietary fiber was 20g fiber/day. A summary of the 2007 recommendations are as provided below.

TRANSLATION OF 2007 Vietnam RDA INTO NUTRITIONAL GUIDELINES, POLICIES AND PROGRAMS

Table 7. Requirements for Vitamins

Age group, gender	A	D	E	K	C	B1 (Thia- min)	B2 (Ribo- flavin)	B3 (Niacin)	B6	B9 (Folat)	B12
	(mcg/ day) ^a	(mcg/ day) ^c	(mg/ day) ^d	(mg/ day)	(mg/ day) ^b	(mg/ day)	(mg/ day)	(mg NE/ day) ^e	(mg/ day)	(mcg/ day) ^f	(mcg/d)
<i>Children</i>											
< 6 months	375	5	3	6	25	0.2	0.3	2	0.1	80	0.3
6–11 months	400	5	4	9	30	0.3	0.4	4	0.3	80	0.4
1–3 years	400	5	5	13	30	0.5	0.5	6	0.5	160	0.9
4–6 years	450	5	6	19	30	0.6	0.6	8	0.6	200	1.2
7–9 years	500	5	7	24	35	0.9	0.9	12		300	1.8
<i>Male adolescence</i>											
10–12 years		5	10	34							
13–15 years	600		12	50	65	1.2	1.3	16	1.3	400	2.4
16–18 years			13	58							
<i>Male adults</i>											
19–50 years		5	12	59					1.3		
51–60 years	600	10			70	1.2	1.3	16	1.7	400	2.4
>60 years		15									
<i>Female adolescence</i>											
10–12 years		5	11	35							
13–15 years	600		12	49	65	1.1	1	16	1.2	400	2.4
16–18 years			12	50							
<i>Female adults</i>											
19–50 years	500	5	12	51	70				1.3		
51–60 years		10				1.1	1.1	14	1.5	400	2.4
>60 years	600	15			70						
<i>Pregnant women</i>	800	5	12	51	80	1.4	1.4	18	1.9	600	2.6
<i>Breastfeeding women</i>	850	5	18	51	95	1.5	1.6	17	2	500	2.8

^a According to FAO/WHO the following equivalences could be used: 01mcg vitamin A or Retinol = 01 mcg Retinol (RE); 01 (IU) is equivalent to 0,3 mcg vitamin A. ^b Excluded of loss in processing, cooking because Vitamin C is destroyed easily by oxidating, light, alkali and heat. ^c Note: 01 (IU) is equivalent to 0,03 mcg vitamin D3 (cholecalciferol).or: 01 mcg vitamin D3 = 40 (IU). ^d Equivalent transformation from mg to (IU) based on IOM-FNB 2000. ^e Niacin or normality Niacin. ^f Equivalent transformation of biological values from Acid folic: 1 acid folic = 1 folat x 1,7. Or: 01 gam of normality acid folic = 01gam folat trong thuc pHem + (1,7 x gam of total acid folic).

Table 8. Requirements for minerals

Age group, gender	Ca (calcium)	Iodine	Iron (mg/day) by biological values of calorie intake			Zinc (mg/day), By absorption amount			Mg (Magnesium)	P (Phos- phorus)	Selen
	(mg/ day)	(mcg/day)	5% ^a	10% ^b	15% ^c	Good	Moderate	Poor	(mg/ nguy)	(mg/ nguy)	(mg/ nguy)
<i>Infants</i>											
< 6 months	300	90		0.93		1.1 ^e	2.8 ^f	6.6 ^g	36	90	6
6–11 months	400		18.6	12.4	9.3	0.8 ^h – 2.5 ⁱ	4.1 ⁱ	8.3 ⁱ	54	275	10
<i>Children</i>											
1–3 years	500	90	11.6	7.7	5.8	2.4	4.1	8.4	65	460	17
4–6 years	600		12.6	8.4	6.3	3.1	5.1	10.3	76	500	22
7–9 years	700		17.8	11.9	8.9	3.3	5.6	11.3	100	500	21
<i>Male adolescence</i>											
10–12 years		120							155		
13–15 years	1000	150	29.2	19.5	14.6	5.7	9.7	19.2	225	1250	32
16–18 years		150	37.6	25.1	18.8				260		
<i>Male adults</i>											
19–50 years						4.2	7.0	14.0	205	700	34
51–60 years	1000	150	27.4	18.3	13.7						
> 60 years						3.0	4.9	9.8			33
<i>Female adolescence</i>											
10–12 years (without menstruation)		120	28.0	18.7	14.0				160		
10–12 years	1000		65.4	43.6	32.7	4.6	7.8	15.5		1250	26
13–15 years		150	62.0	41.3	31.0				220		
16–18 years									240		
<i>Female adults</i>											
19–50 years				39.2	29.4	3.0	4.9	9.8			
51–60 years	1000	150	58.8	15.1	11.3	3.0	4.9	9.8	205	700	26
> 60 years						4.2	7.0	14.0			25

^a Low iron calorie intake (only 5% of iron amount absorbed): poor dietary, amount of meat or fish is <30 g/day or vitamin C <25 mg/day. ^b Average iron calorie intake (about 10% of iron absorbed): when intake amount of meat or fish is 30g – 90g/day or vitamin C from 25 mg – 75 mg/day. ^c High iron calorie intake (about 15% of iron amount absorbed): when intake amount of meat or fish is > 90g/day or vitamin C > 75 mg/day. ^d Supply of iron tablets is recommended for all pregnant women during pregnancy. Women with anaemia should be provided with higher supplementary dose. ^e Breastfed infants; ^f Infants fed with artificial milk. ^g Children fed with artificial food which is rich in phytat and vegetable protein. ^h Not applicable for totally breastfed infants. ⁱ Good absorption: good biological values of zinc = 50 % (calorie intake is rich in animal or fish protid); moderate absorption: biological values of zinc is normal = 30 % (calorie intake is moderate in animal or fish protid); poor absorption: low biological values of zinc.

Table 8. Requirements for minerals. (cont.)

Age group, gender	Ca (calcium)	Iodine	Iron (mg/day), by biological values of calorie intake			Zinc (mg/day), by absorption amount			Mg (Magnesium)	P (Phosphorus)	Selen
	(mg/day)	(mcg/day)	5% ^a	10% ^b	15% ^c	Good	Moderate	Poor	(mg/day)	(mg/day)	(mg/day)
<i>Pregnant women</i>											
14–18 years										1250	
19–30 years	1000	200	+30.0 ^d	+20.0 ^d	+15.0 ^d				205	700	
31–50 years											
3 early months						3.4	5.5	11.0			26
3 middle months						4.2	7.0	14.0			28
3 last months						6.0	10.0	20.0			30
<i>Bbreastfeeding women</i>											
14–18 years										1250	
19–30 years	1300	200							250	700	
31–50 years											
0-3 months						5.8	9.5	19.0			
4-6 months						5.3	8.8	17.5			35
After 6 months						4.3	7.2	14.4			42

^a Low iron calorie intake (only 5% of iron amount absorbed): poor dietary, amount of meat or fish is <30 g/day or vitamin C <25 mg/day. ^b Average iron calorie intake (about 10% of iron absorbed): when intake amount of meat or fish is 30g – 90g/day or vitamin C from 25 mg – 75 mg/day. ^c High iron calorie intake (about 15% of iron amount absorbed): when intake amount of meat or fish is > 90g/day or vitamin C > 75 mg/day. ^d Supply of iron tablets is recommended for all pregnant women during pregnancy. Women with anaemia should be provided with higher supplementary dose. ^e Breastfed infants; ^f Infants fed with artificial milk. ^g Children fed with artificial food which is rich in phytate and vegetable protein. ^h Not applicable for totally breastfed infants. ⁱ Good absorption: good biological values of zinc = 50 % (calorie intake is rich in animal or fish protein); moderate absorption: biological values of zinc is normal = 30 % (calorie intake is moderate in animal or fish protein; proportion of phytate-molecular zinc is 5 : 15). Poor absorption: low biological values of zinc.

A food based dietary guideline for Vietnam was developed and approved by Ministry of Health in 2007 as the follows:

1. Eat a variety of foods and frequently change the menu.
2. Early breastfeed the baby just after birth and exclusively breastfed for six months, appropriate complementary foods can be added while continuing to breastfeed up to 18 to 24 months.
3. Consume protein-rich foods with a balance between animal and plant sources, promote fish consumption.
4. Control fat consumption and maintain a balance between animal fat and plant oil sources.
5. Using milk and milk products according to the age group.
6. Avoid salty foods and use iodized salt for daily food preparation and consumption.
7. Eat more fruits and vegetables everyday.
8. Maintain the hygiene and safety of food and beverages.
9. Drink enough the water, limit alcohol, beer and sweet beverages.
10. Choose an active lifestyle, increase physical activity, maintain your weight, and avoid smoking.

The revised RDA and its translation into dietary guidelines is an important nutritional education tool for Vietnam. The plan is to create a national food security committee for the promotion of consumption of fish, and to focus on food safety regarding vegetables, import foods, and other food products. These efforts will also help to implement the National Nutrition Strategy in Vietnam, which will incorporate nutrition labeling.

AUTHOR DISCLOSURES

Nguyen Cong Khan and Pham Van Hoan, no conflicts of interest.

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