

RECOMMENDED DIETARY ALLOWANCES AND FOOD-BASED DIETARY GUIDELINES: USES FOR PATIENT-COUNSELLING

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ABSTRACT

Dietary modification plays an important role in both prevention and management of non-communicable chronic diseases. General Practitioners have the opportunity to provide advice on dietary modification during consultations. They can use the Recommended Dietary Allowances and Food-based Dietary Guidelines to assess a patient's diet and provide relevant advice. In addition, there are other resources from the Health Promotion Board that General Practitioners can use to assist their patients in preventing and managing chronic diseases.

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INTRODUCTION

Non-communicable chronic diseases are the leading cause of death in Singapore. In 2006, cancers, ischaemic heart disease, cerebrovascular disease, and diabetes accounted for nearly 60% of all deaths (MOH, 2006).

Dietary modification plays an important role in both prevention and management of non-communicable chronic diseases. The World Health Organisation states that alterations in diet have strong effects, both positive and negative, on health throughout life, and that dietary modification may not only influence present health, but may determine whether or not an individual will develop such diseases as cancer, cardiovascular disease and diabetes much later in life (WHO, 2003). Likewise, recommendations for the use of dietary modification in treating hypertension, diabetes, and lipid disorder have been made in their respective MOH Clinical Practice Guidelines.

This paper presents background information on the Recommended Dietary Allowance and Food-based Dietary Guidelines and how they can be used to provide opportunistic advice during consultations.

RECOMMENDED DIETARY ALLOWANCES & TOLERABLE UPPER LEVELS OF INTAKE

Recommended Dietary Allowances (RDAs) are age- and gender-specific recommendations for nutrient intake that are thought to provide optimal health for the majority of the population. The RDA is defined as the level of intake at which the nutrient needs of 97-98% of the population will be met.

A copy of the Singapore RDAs is provided in the appendix and is also available on the Health Promotion Board website at <http://www.hpb.gov.sg>.

Implications for Practice

RDAs have a role to play in assessing nutrient adequacy for both the entire population and for individuals, but are not so useful when advising patients on dietary changes, as patients think in terms of food rather than nutrients and generally find it difficult to apply the RDAs to their daily diets.

RDAs are useful in assessing vitamin and mineral supplement intake in patients. A quick rule-of-thumb is that unless medically indicated, the maximum intake of any nutrient from supplements should be no more than 100% of the RDA. Limiting intake from supplements to 100% of the RDA ensures that intake from both supplements and food does not exceed the maximum safe dose. Moreover, individuals generally do not gain additional benefits by consuming a nutrient in amounts exceeding the RDA.

Food-Based Dietary Guidelines

Patients are more familiar with the idea of food rather than that of nutrients; hence food-based dietary guidelines are more useful than RDAs during patient counseling. Food-based dietary guidelines also allow focus on dietary patterns (Reddy & Katan, 2001), and non-nutrient compounds (e.g. phytochemicals such as lycopene, isoflavones, leutin), both of which are able to affect health, and allows for education on food preparation.

The current set of dietary guidelines in Singapore were released in 2003 (for adults) and in 2007 (for children & adolescents). The dietary guidelines are evidence-based. For the 2007 guidelines, the system used at the time by the Ministry of Health Clinical Practice Guidelines (CPG) was adopted to grade evidence and recommendations. In the current revisions to the 2003 dietary guidelines for adults the Scottish Intercollegiate Guidelines Network (SIGN) system of grading evidence, currently used by the CPG working groups, was adopted.

In Singapore, food-based dietary guidelines provide advice on both groups of food and nutrients. Figure 2 lists the dietary guidelines for adults. Dietary guidelines for children & adolescents can be found in the booklet "Dietary Guidelines for Children and Adolescents for the Healthcare Professional." We summarize some of the evidence reviewed in the process of creating Singapore's dietary guidelines below.

Encourage

1. Variety

People who have a varied diet, i.e. those who eat from all four food groups and have different types of food from each food

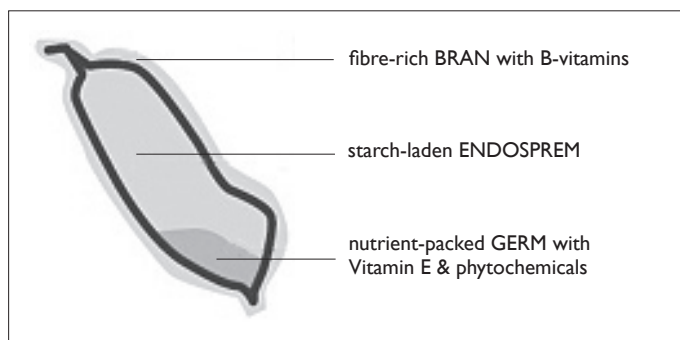
group, are more likely to meet their nutrient requirements. These foods should all be low in fat, especially saturated fat, low in sodium and low in added sugar.

2. Whole-grain foods

The grain of wheat or rice has a three-layered structure comprising of the bran, the germ, and the endosperm. (See Figure 1). The milling process determines how much of the whole-grain is retained, with “white” grain products (e.g. white rice, white flour) consisting mostly of the carbohydrate-rich endosperm and losing the nutrient-rich bran and germ. Examples of foods rich in whole-grain include oats, brown rice, and wholemeal/whole wheat noodles, bread and breakfast cereals.

Whole-grains can reduce the risk of cardiovascular disease (Mellen et al, 2007) and Type 2 diabetes, even in older adults (Liu, 2003; de Munter et al, 2007). There is also evidence to suggest that whole-grains can reduce the risk of colorectal and oesophageal cancer, as well as assist in modest weight loss, although more studies are needed to confirm these findings.

Figure 1. Grain of wheat or rice



3. Fruit and vegetables

In the local context, the vegetable food group includes all fresh, frozen and well-drained canned vegetables, but not tubers (e.g. potatoes, yam) and legumes (e.g. beans, lentils). Tubers are considered to be part of the rice & alternatives food group due to its high starch content, and legumes belong to the meat & alternatives food group as they are good sources of protein. The fruit food group includes fresh, frozen, well-drained canned or dried fruit or pure (100%) fruit juice.

A diet rich in fruit and vegetables is associated with a reduced risk of coronary heart disease (He et al, 2007) and stroke (He et al, 2006). Fruit and vegetables may also protect against cancers of the mouth, pharynx, larynx, esophagus, stomach and lung (fruit only) (AICR, 2007). In addition, fruit and vegetables may be a useful component of programs designed to achieve and sustain weight loss (Howard et al, 2006). Our recommendation is to eat at least 2 servings of fruit and 2 servings of vegetables everyday.

4. Foods high in calcium

For adolescents and adults up to the aged of 30 years, an adequate intake of calcium is one of several factors that have

FIGURE 2. Dietary Guidelines for Adults

1. Enjoy a Variety of Food Using the Healthy Diet Pyramid as a Guide
2. Achieve and Maintain Body Weight Within the Normal Range
3. Eat Sufficient Amounts of Grains, Especially Whole Grains
4. Eat more Fruit and Vegetables Every Day
5. Choose and prepare Food with Less Fat, Especially Saturated Fat
6. Choose and Prepare Food with Less Salt and Sauces
7. Choose Beverages and Food with Less Sugar
8. If you drink Alcoholic Beverages, Do So in Moderation

been associated with maximal accumulation of bone mass (Heaney et al, 2001). Individuals attain their peak (maximal) bone mass before the age of 30 years, after which bone mass gradually declines, but continued consumption of calcium-rich foods can help prevent bone loss (Murphy et al, 1994). Our recommendation is that all adults above 18 years of age should consume 250 ml of milk (or alternatives) to help meet the calcium RDA.

Aside from milk and dairy products, dark green leafy vegetables (e.g. kai lan, chye sim), fish with edible bones, calcium-fortified products (e.g. calcium-fortified soybean milk and cereals), and tofu (which is set with calcium) are good sources of calcium.

Reduce

1. Total fat and saturated fat

Foods high in fat contribute to weight gain and hence obesity. Intake of saturated fat, in particular those fats found in palm and coconut products, has also been linked to an increased risk of cardiovascular disease (WHO, 2003). In addition, there is limited, but suggestive evidence that total fat intake is associated with cancer of the lung and the breast (postmenopausal women only) (AICR, 2007).

2. Sodium

There is good evidence to show that reducing sodium intake from salt and other sources is able to lower blood pressure in both healthy individuals and individuals with hypertension (He & MacGregor, 2002). In addition, reducing sodium intake may help individuals at risk for hypertension to lower their risk of hypertension (TOHP Collaborative Research Group, 1997). Individuals with a lower intake of sodium have a lower risk of developing stomach cancer (AICR, 2007).

3. Added Sugar

Added sugar is sugar that is not found normally in foods, but is added during manufacturing, cooking, or when eating. This includes table sugar (sucrose), honey, and other sweeteners. The consumption of sugar-sweetened drinks has been associated with an increased risk of weight-gain, and hence obesity, in both adults and children (WHO, 2003; Malik et al, 2006).

4. Alcohol

Studies show that alcohol consumption may protect against heart disease in middle-aged men. However, people who do not drink alcohol should not start drinking as the harms associated with alcohol far outweigh any possible benefits. For people who drink alcohol, women should consume no more than 2 standard drinks a day, and men no more than 3 standard drinks a day. One standard drink contains 10g of pure alcohol and is equivalent to 2/3 can of beer (220ml), 1 glass of wine (100ml), or 1 nip (30ml) of spirits.

Children and Adolescents

Children and adolescents should adopt a dietary pattern similar to adults with the aim of developing dietary habits that will provide good health in adulthood. The age-appropriate number of servings for each food group can be found in the booklets “Dietary Guidelines for Children and Adolescents for the Healthcare Professional” and “Birth to Eighteen Years.”

In addition to the above, the dietary guidelines for children and adolescents include the following additions or modifications:

- All healthy infants should be exclusively breastfed for the first 6 months of life. Exclusive breastfeeding means breast milk only with no other solids or liquids (including water), with the exception of vitamin or mineral supplements and medicine.
- Low-fat milk should only be introduced after 2 years of age as the calories provided by full-fat milk are required by infants aged 2 years and below for growth.
- Alcohol is not recommended for children and adolescents.

Implications for Practice

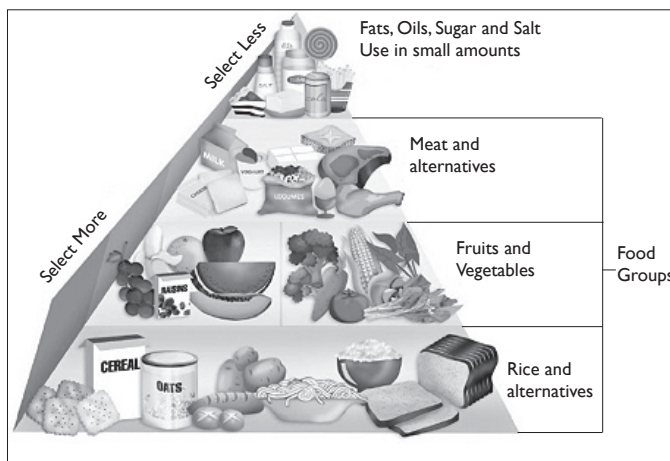
The Healthy Diet Pyramid (see Figure 3) is a graphical representation of the dietary guidelines, depicting the four different food groups (rice & alternatives, fruit, vegetables, and meat & alternatives), a group of food types to avoid (fat, sugar, salt), and shows the variety of foods possible within each food group.

The booklets “ABCs of Healthy Eating” (for adults) or “Birth to Eighteen Years” (for children & adolescents) contain information on the age-appropriate number of servings from each food group and the definition of one serving and can be used together with the Healthy Diet Pyramid diagram to conduct a quick dietary assessment for patients without non-communicable chronic diseases.

Some suggested information to tell your patients is:

- If a patient is eating less than the recommended number of servings for a food group, encourage them to meet the recommendations. Conversely, if they eat more than the recommended number of servings, advise them to reduce their intake.

Figure 3. The Healthy Diet Pyramid



- Emphasize whole-grain foods (e.g. brown rice, wholemeal bread, oats) as replacements for refined grained foods (e.g. white rice, white bread).
- Rice & alternatives
 - Emphasize whole-grain foods (e.g. brown rice, wholemeal bread, oats) as replacements for refined grained foods (e.g. white rice, white bread).
- Fruit & Vegetables
 - Emphasize fruit and vegetables with brightly-coloured flesh (e.g. tomatoes, papaya, carrots, bell peppers, green leafy vegetables, plums) as these contain more vitamins, minerals and phytochemicals.
- Meat & alternatives
 - Emphasize choosing calcium-rich foods (e.g. low-fat milk, cheese, yoghurt, tofu, calcium-fortified soy milk).
 - Suggest replacing some meat with plant products (e.g. soy products, beans, nuts).
- Fat, sodium and added sugar
 - Emphasize that when grocery shopping, the Healthier Choice Symbol (Figure 4) can be used as a guide to foods lower in fat, sodium and added sugar. A list of foods with the Healthier Choice Symbol can be found on the HPB website.
 - Suggest using herbs and spices to replace salt and sauces to flavour food.

Figure 4. Healthier Choice Symbol



More detailed advice is found in the booklets intended for healthcare professionals “Dietary Guidelines 2003 for Adult Singaporeans (18-65 years)” and “Dietary Guidelines for Children and Adolescents for the Healthcare Professional.”

The Healthy Diet Pyramid, with a few modifications, can also be used for patients who are overweight/obese or those with diabetes, hypertension, or lipid disorders. The general advice for dietary modification can be given with emphasis on the following:

- Overweight/Obese
 - Serve smaller portion sizes to lower calorie intake. People tend to finish all the food on their plate, hence serving smaller portions at meals will help to lower calorie intake.
 - Choose foods that are lower in fat and added sugar, especially drinks that are low in added sugar. Sugar-sweetened drinks do not make a person feel full, hence a person does not compensate by eating less at meals and consequently has a higher calorie intake.
 - Eat the recommended amount of fruit, vegetables and whole-grain products to promote satiety.
 - Patients with diabetes, hypertension, lipid disorder or other non-communicable chronic diseases should be encouraged to lose weight if they are overweight or obese.
- Diabetes
 - Replace refined grained foods (e.g. white rice, white bread) with whole-grain foods (e.g. brown rice, wholemeal bread, oats), eat sufficient amounts of fruit and vegetables and reduce intake of foods with added sugar to have better control over blood glucose levels.
- Hypertension
 - Reduce sodium intake by cutting down the use of salt and sauces during cooking and when eating.
 - Eat the recommended servings of fruit and vegetables to increase potassium intake to keep a more balanced sodium-potassium ratio.
- Lipid disorder
 - Choose foods low fat, especially saturated fat. Limit animal fat (e.g. butter, ghee, or lard), coconut milk and coconut/palm oil (may be labelled “vegetable oil”).
 - Choose foods low in dietary cholesterol and keep intake to no more than 300mg/day. Individuals with elevated low-density lipoprotein (LDL) cholesterol, diabetes, and/or cardiovascular disease should keep their intake of cholesterol to less than 200mg/day. Foods high in cholesterol are shellfish, eggs and offal meats.
 - Eat the recommended servings of fruit and vegetables for sufficient fibre.

Detailed advice can be found in the booklets “A Guide to Dietary Management for Diabetes, Hypertension, Lipid Disorders and Stroke” and “Dietary Guidelines 2003 for Adult Singaporeans (18-65 years).” These booklets are only available from the Health Information Centre at the Health Promotion Board building.

BEYOND OPPORTUNISTIC DIETARY ADVICE

In addition to opportunistic advice, you can inform your patients about other resources available. “AIM – Be in charge of your health” is a set of booklets for patients who have diabetes, hypertension, lipid disorders, or who have had a stroke. This set contains resources that patients can use to monitor their condition.

You may consider participating in the Integrated Screening Programme, which is available to CDMP-registered GP clinics. Under this Programme, you will be able to offer affordable screening on diabetes, hypertension, lipid disorders, obesity and cervical cancer to your patients. For enquiries on this programme you can email HPB_IntegratedScreening@hpb.gov.sg

To complement the management of chronic diseases at your clinic, workshops are also available at six community centres. Led by trained Nurse Educators, the workshops educate and provide skills to individuals with a chronic condition on how to manage their condition optimally. Participants will subsequently be followed-up at 3, 6 and 12 months after the workshop. For enquiries on the programme or patient referrals you can email hpb_nurse_educator@hpb.gov.sg.

Resources are also available for patients on the Internet. The Health Promotion Board (HPB) website (<http://www.hpb.gov.sg>) contains PDF copies of the booklets mentioned, as well as the Food Info Search. The Food Info Search contains information on the nutrient content of common, everyday foods and even allows patients to record the food they’ve eaten for the past few days and calculate their nutrient intakes. Also available on the HPB website is the Diet Tracker, a mobile phone application that patients can download to keep track of their calorie and fat intake. In future, there may be Internet-based resources that allow patients to manage their health and conduct a health assessment online.

CONCLUSIONS

General Practitioners have opportunities to give advice on dietary modification to patients. The Recommended Dietary Allowances (RDAs) and Dietary Guidelines / Healthy Diet Pyramid are evidence-based tools that you can use to perform a quick assessment and give advice to patients on dietary modification. Use the Healthy Diet Pyramid, together with the relevant booklets, to provide sound dietary advice to your patients, and in doing so, allow them to prevent and manage chronic diseases.

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LEARNING POINTS

- **RDAs are useful in assessing vitamin and mineral supplement intake. The maximum intake of any nutrient from supplements should be no more than 100% of the RDA.**
- **Food-based dietary guidelines are more useful than RDAs during patient counseling as patients are more familiar with food versus nutrients.**
- **Evidence indicates that a diet high in whole-grain foods, fruit, vegetables, and calcium-rich foods while low fat (especially saturated fat), sodium, added sugar, and alcohol will reduce the risk of developing chronic diseases in adults.**
- **Infants should be exclusively breastfed for the first 6 months of life. Children aged 7 months or older and adolescents should follow the diet pattern recommended for adults with the following modifications – Low-fat foods should only be given to children above 2 years of age; alcohol should not be given to children and adolescents.**
- **The Healthy Diet Pyramid is a graphical representation of the dietary guidelines and can be used both to assess a patient's diet and provide advice for dietary modification.**
- **By including advice that focuses on relevant dietary modifications, the Healthy Diet Pyramid can also be used for patients who are overweight/obese or those with diabetes, hypertension, or lipid disorders.**
- **Resources available for patients with chronic diseases include “AIM – Be in charge of your health” (self-management of chronic disease), the Integrated Screening Programme available to CDMP-registered GP clinics, and Nurse Educators at selected Community Centres.**

APPENDIX

Recommended Dietary Allowances for Adults

		Iron (mg)	Vitamin A (retinol equivalent) (µg)	Vitamin D (µg)	Vitamin C (mg)
Men	18-30 years	6	750	30	2.5
	30-60 years	6	750	30	2.5
	>60 years	6	750	30	2.5
Women	18-30 years	19	750	30	2.5
	30-60 years	19	750	30	2.5
	>60 years	6	750	30	2.5
	Pregnant	19	750	50	10
	Lactating	19	1200	50	10

		Thiamin (Vitamin B1)	Riboflavin (Vitamin B2) (µg)	Niacin (mg)	Vitamin B12 (µg)	Folic Acid (µg)
Men	18-30 years	1.18	1.77	19.5	2.0	200
	30-60 years	1.16	1.74	19.1	2.0	200
	>60 years	0.98	1.47	16.2	2.0	200
Women	18-30 years	0.84	1.26	13.9	2.0	200
	30-60 years	0.86	1.29	14.2	2.0	200
	>60 years	0.80	1.20	13.2	2.0	200
	Pregnant	+0.11	+0.17	+1.9	3.0	400
	Lactating	+0.2	+0.30	+3.3	2.5	300

		Calcium (mg)
Men	19-50 years	800
	51 years and above	1000
Women	19-50 years	800
	51 years and above	1000
	Pregnant	1000
	Lactating	1000