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Contents

Invited Editorial	Siii
Food-Based Dietary Guidelines (FBDGs): Their Future	
Editor's Commentary	Svii
More Food for Thought on Food-Based Dietary Guidelines	
Food-Based Dietary Guidelines of Southeast Asian Countries: Part 1 - A Compilation and Analysis of Key Messages	S1
<i>Tee ES, Hardinsyah R, Florentino RF, Ismail MN, Suthutvoravut U & Hop LT</i>	
Food-Based Dietary Guidelines of Southeast Asian Countries: Part 2 - Analysis of Pictorial Food Guides	S49
<i>Florentino RF, Tee ES, Hardinsyah R, Ismail MN, Suthutvoravut U & Hop LT</i>	
Acknowledgements	S67

Invited Editorial

Food-Based Dietary Guidelines (FBDGs): Their Future

ABSTRACT

The promulgation of the joint WHO-FAO Cyprus Declaration in 1995, established the principles and procedures for countries to develop their customised Food-Based Dietary Guidelines (FBDGs). One of the earliest acculturations of the FBDGs was undertaken by WHO for the Western Pacific region. This process has been continued for the Southeast Asian region, where revisions have now been made to reflect its changing health patterns and food systems. The greatest challenge to FBDG revision is how climate change is and will affect food supply and health. The world has become more populous, the risks to food insecurity have escalated with growing inequity, conflict and mass migration are rife, trading arrangements have become fragile, and climate change is proceeding apace. The future depends on sustainable ecosystems, the food and water they provide and us as ecological beings.

Key words: Food-Based Dietary Guidelines, Southeast Asia, sustainable ecosystems

Why food?

Foods and beverages are what we consume for sustenance, health, social intercourse and pleasure. The system which provides these benefits must be accessible, safe, affordable, equitable and sustainable. We are omnivores who can live on a wide range of dietary patterns unlike most other creatures. This is both our biological advantage and our ecological Achilles heel. We have ranged far and wide in our evolution, populating and compromising countless ecosystems.

The characteristics of diets considered optimal for health were generally agreed by national and international authorities in the latter half of the 20th century. In 1995, a joint WHO-FAO consultation produced the evidence-based Cyprus Declaration which established the principles and procedures for communities, countries and regions to develop their customised Food-Based Dietary Guidelines (FBDGs) (Wahlqvist *et al.*, 1999). The over-riding guideline was that of a biodiverse diet, where most of the diversity would be generated through plant-derived foods, understood to encourage inclusion of legumes and, where culturally acceptable, mushrooms, even though the latter are technically fungi. The logic in a biodiverse diet is not only its physiological and metabolic coherence, but also its representation of a healthful environment in which to live or with which to trade, its insurance of essential nutrient coverage, and its minimisation of adverse exposures (Wahlqvist, 2014). It does not presuppose any one food culture, although some are more diverse than others and more restrained through geoclimatic and socio-economic factors.

In the minds of those of us who drew up the Cyprus Declaration was the importance of the intactness of food required to deliver functions dependent on its structure and physico-chemical properties. This rationale has been consolidated over the years (Wahlqvist, 2016). However, what is now more obvious is that we are ourselves an intimate part of our environment in many ways, microbiologically through our microbiomes; sensory-wise through tactile, olfactory, gustatory, visual, auditory and many other receptor pathways widely distributed in tissues; hormonally through the endocrine properties of food and environmental contaminants like plastics. We are, in reality ecological creatures.

Ecologically, where and how we live are keys to FBDG ownership and application. We

can endeavour to ensure livelihoods which benefit from and promote healthy eating. Even so, there will be difficulties. One way to address the limitations which communities find in supporting FBDGs is to connect their households more effectively and to have communities complement each other with people and other resources including food and health services (Wahlqvist, 2009). These strategies are now more feasible with the internet and smart phones which have become almost ubiquitous.

Various lines of evidence were brought to bear on the FBDG principles which have been applied in many settings. One of the earliest acculturations of the FBDGs was undertaken by WHO for the Western Pacific region. It took account of the various food habits in the region. This process has been continued for the Asia Pacific region, where national reports were published collectively in the *Asia Pacific Journal of Clinical Nutrition* in 2011. Revisions have now been made for Southeast Asia (Tee *et al.*, 2016) to reflect its changing health patterns and food systems, particularly in regard to food security. The task is to optimise diets, place by place.

It is becoming clear, however, that dietary diversification is challenged by poverty and inequity, conflict, displacement, the ultra-processing of food, natural disasters, urbanisation and demographic change towards ageing populations and households. For these reasons, efforts are being made to improve the nutritional value of staple crops on which much of the world depends, as with the Harvest Plus biofortification initiative.

Climate change

The greatest challenge to FBDG revision is how climate change is and will affect the food supply and health. It will affect both quantity and quality. Within a generation, all of the rivers of Asia which emanate from the Tibetan plateau will be running dry - and it is likely that the Indonesian archipelago will suffer increasing drought, as will Australasia. With failure of water and food systems in the Asian region, it is estimated that more than 2 billion people will be affected (Wahlqvist, 2014). This does not take into account depleted ground water and the irrigation on which it depends, rising sea levels and effects on coastal food production, or super storms and other natural disasters now projected by Hansen *et al.* (2016).

Operationalisation

The difficulty with the advent of the FBDGs initiative in 1995 is that it was not coupled with an implementation policy other than that the guidelines should be developed. There was pointless discussion about their 'harmonisation' rather than their adaptation and little action to operationalise them (Wahlqvist, 2009). Meanwhile, the world has become more populous, the risks to food insecurity have escalated with growing inequity, conflict and mass migration are rife, trading arrangements have become fragile, and climate change is proceeding apace.

Of particular concern, ethical problems are growing in regard to the limited availability of nutritious and safe foods, free from environmental contamination (Friel & Baker, 2009). This applies particularly to massive food waste (30-50% of all that is produced), declining fish stocks, contaminated with microplastics and other endocrine disruptors, to livestock immune-compromised on account of multiple antibiotic resistant genes, crops growing in recently industrialised areas with contaminated soil and water and vanishing waterways whose glacial sources have melted without replacement. The explicit identification in dietary guidelines of the adverse effects of ultra-processed food has been reflected by FAO in its proposals for climate change-sensitive dietary guidelines (Fischer & Garnett 2016). Such understanding of food and health must now inform FBDGs more

widely. Better governance of food systems is now a pressing issue for the architects of FBDGs and policy implementers.

The future

The re-visitation of all food, nutrition and health policy instruments with a view to their validity, currency and fitness for action is to be encouraged. That includes the FBDGs, region by region, locality by locality. The need to do so in Asia is great, as are the benefits of doing so. The future depends on sustainable ecosystems, the food and water they provide and us as ecological beings.

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Editor's Commentary

More Food for Thought on Food-Based Dietary Guidelines

In this supplement, the authors have chronicled detailed descriptions and comparisons of the food-based dietary guidelines (FBDGs) of six Southeast Asian nations. The appeal of the authors on the need for more effective communication of the messages should be heeded by all healthcare sectors – government, industry, academia – as well as professional societies and consumer associations. Indeed, FBDGs are not meant for healthcare practitioners only; the messages are, as importantly if not more so, for the general public as well. Thus, there should be more concerted strategic efforts among the various stakeholders in disseminating FBDG messages through various communication channels, including new media networks to reach young population groups. Presently, the FBDGs lack visibility among the general population, and offering simplified messages is one way forward towards increasing public awareness of the dietary guidelines.

In relation to enhancing the public's understanding of healthy dietary guidelines, I wish to draw attention to a new landmark joint publication of the Food and Agriculture Organization (FAO) and Food Climate Research Network (Fischer & Garnett, 2016). In reviewing country FBDGs, this document "explores if and how countries incorporate sustainability in their FBDG." There is increasing global interest for developing guidelines which advise on dietary patterns that align health and environmental goals. This document provides examples of country FBDGs and research evidence to exemplify how dietary patterns that have low environmental impact can be consistent with good health. Four countries were cited as having such characteristics in their FBDGs, namely Brazil, Germany, Qatar and Sweden.

In order to incorporate the environmental impact of diets, the FAO document stressed on the need for several salient and practical guidelines to be put in place at the policy and program implementation levels. These include:

- People are informed about the relationships between food and sustainability and people are informed about the need for such dietary patterns.
- Guidelines should consider current consumption patterns and the cultural context, so they do not 'stretch' people unrealistically.
- The environmental benefits of limiting over-consumption of all foods.
- Provide clear guidance on
 - Food waste reduction.
 - Which fruits and vegetables to seek out in preference to others.
 - Safe and energy efficient food preparation.

As the countries in the region consider reviewing their FBDGs or developing FBDGs for the first time, the impact of food systems on the environment and broader sustainability issues should be appropriately incorporated. This will be in line with the clarion call worldwide for emphasising on dietary patterns that impose a low burden on environmental limits. Such dietary patterns would represent marked improvement "on the way people currently eat, a point that is true both in countries where the main problems are

those of over-consumption and non-communicable diseases, and in contexts where diets lack diversity and where hunger and under-consumption are of critical concern”.

Emeritus Professor Khor Geok Lin PhD, FASc

Editor

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Food-Based Dietary Guidelines of Southeast Asian Countries: Part 1- A Compilation and Analysis of Key Messages

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ABSTRACT

Introduction: A project to compile and analyse the key messages and scientific rationale of the officially published food-based dietary guidelines (FBDGs) in six Southeast Asian countries was undertaken to understand their similarities and differences. **Methods:** Key messages and the accompanying scientific rationale in the FBDGs of Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam were compiled, with similar messages grouped together by topics. For each topic, the key message and scientific rationale were analysed for similarities and differences. **Results & Discussion:** A total of 17 topics were identified, covering a wide range of subjects. Twelve of the topics were present in FBDGs of at least four of the countries studied. Hence, there are more similarities than differences in these key messages. This can be expected as countries in the Southeast Asian region do share general socio-demographic similarities. They also face similar problems of the co-existence of under-nutrition and over-nutrition, the latter afflicting an increasing proportion of the population. The scientific rationale used by the countries to substantiate the key messages are rather similar for almost all the topics. Future work in FBDGs should therefore focus on ensuring effective implementation of these messages so as to ensure sufficient understanding and greater adherence to the key messages by the community. **Conclusions:** Countries generally realise the importance of establishing a set of dietary guidelines, developed through consensus and based on current understanding of nutrition science. There could be greater sharing and collaboration among the countries in the region particularly in the areas of development, effective dissemination, promotion and implementation of FBDGs.

Key words: Food-based dietary guidelines, key messages, public health nutrition, scientific rationale, Southeast Asia

INTRODUCTION

Food-based dietary guidelines (FBDGs) are sets of science-based, positive advisory statements that provide dietary advice for the population, aimed at promoting healthy eating in relation to all diet-related conditions, i.e., nutrient deficiencies as well as nutritional excesses. FBDGs translate nutrient recommendations in terms of food, and are intended to provide consistent, simple and practical dietary guidance to enable populations to select healthy diets and prevent diseases. FBDGs have therefore become almost universally accepted tools to provide the public practical advice and information on healthy diets and lifestyles. Dietary guidelines can also guide food production, processing, consumer protection, consumption as well as utilisation patterns at the individual, family and community levels. In this conjunction, FBDGs are useful in guiding countries to formulate food and agricultural policies (FAO, 2015).

The Food and Agriculture Organization (FAO) and World Health Organization (WHO) have long encouraged all countries to develop national FBDGs that are adapted to their nutrition situation, food availability, culinary cultures and eating habits. A Joint FAO/WHO Consultation was organised to provide guidance in the preparation and use of FBDGs almost two decades ago (WHO, 1998). Countries are also encouraged to review and update their national dietary guidelines periodically. This is to ensure greater relevance of the key messages to the prevailing nutrition situation and consumer understanding. More than 100 countries worldwide have developed food-based dietary guidelines including several countries in the Southeast Asian region. It is important that FBDGs

address priority nutrition and health problems of the country and are developed based on sound scientific principles. The guidelines must not be in conflict with prevailing socio-cultural and religious values.

The need for FBDGs cannot be underestimated as most countries in the region are facing the double burden of malnutrition due to the coexistence of under- and over-nutrition, along with issues of food safety. The importance of FBDGs becomes more apparent with new scientific understanding of the relationships between diet, nutrition and health. In addition, rapid urbanisation, changing lifestyles, food supplies and eating patterns have highlighted the need to develop FBDGs and review them periodically.

In cognisance of the importance of FBDGs, the Southeast Asia Public Health Nutrition (SEA-PHN) Network¹ undertook a project to compile and analyse the official dietary guidelines of six countries in Southeast Asia. Part 1 of this Supplement summarises the key messages and scientific rationale of the officially published FBDGs. Commonalities as well as differences in the key messages and scientific basis are identified. Part 2 of this Supplement analyses the pictorial food guides of these FBDGs (Florentino *et al.*, 2016). In line with the objectives of the Network to document and share nutrition information, this compilation of the FBDGs can serve as a reference for other countries in the region intending to establish or review FBDGs.

METHODS

Authors of this paper, who are also Council Members of the SEA-PHN Network, provided official FBDGs of Indonesia, Malaysia, Philippines, Thailand

¹ The Southeast Asia Public Health Nutrition (SEA-PHN) Network is a partnership of key stakeholders in the region, namely nutrition societies/associations and corporate companies, dedicated to promoting public health nutrition among the populations and alleviating nutrition problems in the region (<http://sea-phn.org>). Authors are founding members of the SEA-PHN Network Council.

and Vietnam for the compilation and analysis. A search was also made on the internet for FBDGs in other Southeast Asian countries and found only Singapore had comprehensive official guidelines. The Singapore FBDGs were therefore included in the analysis. Brunei Darussalam has a number of dietary messages in separate leaflets or booklets for dissemination to the public. Myanmar has a complete document on dietary guidelines, but it is not in English. This compilation therefore focuses on FBDGs from the six countries mentioned above, not including Brunei Darussalam and Myanmar. It only focuses on FBDGs for the general population (age from 2 years and above). It is recognised that FBDGs for specific population groups have been established in several countries in the region, e.g., for children and adolescents, pregnant and lactating women and the elderly.

All key messages of each country FBDG were listed with their respective scientific rationale. Similar messages were grouped together by topics. The exact wordings used by the countries to express these messages and the scientific rationale adopted were compared and analysed. For each topic, the key messages and scientific rationale were compared for the six countries in the survey.

RESULTS

Development and format of country FBDGs

The six FBDGs identified for this analysis have widely differing years of implementation with most of the FBDGs being published in the late 2000s or early 2010s. These FBDGs have been published by nutrition and health authorities in the respective countries, usually with input from experts from various organisations. They have been published as reference documents targeted for use by healthcare professionals and policy makers. The

information in these guidelines is being used to develop educational materials for the public and in designing and implementing nutrition-related programs. A focused symposium on progress of FBDGs in Asia was organised in 2011 and reviews of the status of guidelines from six countries in Southeast Asia were presented by Usfar, Takano & Zhang (2011), namely for Indonesia (Soekirman, 2011), Malaysia (Tee, 2011), Philippines (Tanchoco, 2011), Singapore (Lee, 2011), Thailand (Sirichakwal, Sranacharoenpong & Tontisirin, 2011) and Vietnam (Hop, Van & Thanh, 2011). These publications provided useful information on the development and promotion of FBDGs in the six countries in Southeast Asia.

Indonesia

In 1995, the Indonesian food-based dietary guidelines with 13 messages was launched by the Ministry of Health, and formally incorporated into the nutrition policy. The review of the guidelines in 2010 recognised the persistence of under-nutrition and the increase in prevalence of degenerative diseases (Soekirman, 2011). The revised Indonesian FBDG, known as '*Pedoman Gizi Seimbang*' (Guide to Balanced Nutrition) was introduced in 2014 (MOH Indonesia, 2014).

The *Pedoman Gizi Seimbang* has 10 key messages explained in a chapter on messages on nutritional balance. These messages are for healthy adults in the general population. Explanatory notes are contained within each message, including the scientific rationale. Besides the general key messages outlined above, the *Pedoman Gizi Seimbang* also has specific guidelines for various physiological groups (namely pregnant women, lactating women; infants 0 to 6 months; children 6 to 24 months, children 2 to 5 years, children 6 to 9 years; teenagers 10 to 19 years and the elderly).

Besides the main chapter on dietary recommendations, the guideline has a chapter explaining several key elements

of balanced nutrition. The concept of consuming a variety of foods is explained in some detail for four food groups, namely cereals and tubers; fish, eggs, meat, milk and legumes; vegetables; and fruits. For each food group, a table of several examples of foods is presented, with the household serving size and weight for each.

A separate chapter discusses the main principles of balanced nutrition, focusing on four pillars, namely eating a variety of foods, practising personal hygiene; being physically active; and monitoring body mass index regularly. The *Pedoman Gizi Seimbang* also has a section on slogans and visuals where pictorial guides in the form of a *tumpang* on balanced nutrition and a food plate are explained. There is also a section on FBDC's communication, information and education strategies and implementation. Useful appendices on recommended dietary allowance for macronutrients and micronutrients are also included.

Malaysia

The first dietary guideline for Malaysians with 8 key messages was published in 1999. It was reviewed and updated in 2010, prompted by the changes in dietary patterns and lifestyles of Malaysians over the last decades, coupled with increasing prevalence of diet-related chronic diseases and obesity in the country (Tee, 2011).

In the Malaysian Dietary Guidelines 2010, all 14 key messages have explanatory sub-sections including terminology used, introduction, scientific basis for the key messages, and the current status of the population's practices related to that key message. Each key message also has its respective key recommendations followed by advice on 'how to achieve' each of the recommendations. A food pyramid is presented in key message 1 on eating a variety of foods. In key message on 'be physically active', an activity pyramid is

provided. For some relevant key messages, a section of additional recommendations is included for specific groups of population or conditions, for example, children and adolescents, pregnant and lactating women and the elderly. Where appropriate in the key message, useful appendices have also been included to provide more details (NCCFN Malaysia, 2010).

The Philippines

In the Philippines, the first set of FBDC (Nutritional Guidelines for Filipinos(NGF)) was formulated in 1990 and consisted of five main messages. The sub-messages of the NGF were updated and the second edition of the NGF was published in 2000 (Tanchoco, 2011). This revised NGF has 10 key messages, contained in a document with 10 chapters (FNRI Philippines, 2000).

The Nutritional Guidelines for Filipinos was further revised in 2012 (FNRI Philippines, 2015) and this is the edition used for compilation and analysis in this paper. The 10 key messages and the format of this new NGF are rather similar to those in the 2000 edition. Each chapter includes a write up on the scientific rationale for the key message. For messages related to food groups, information is provided on the role of the relevant foods, sources and functions of the foods and associated nutritional deficiencies or excesses. There is also a frequently-asked-questions (FAQs) section presenting answers to the common questions related to the key messages. For other messages such as breastfeeding, food safety, body weight and physical activity, the scientific rationale for these recommendations are provided. At the end of each chapter, an action plan section is included to summarise the advice to achieve the recommendations. Where appropriate, the key message also includes recommendations for specific age groups (children & adolescents, adults, pregnant & lactating women, older persons) as well as their special nutrition concerns.

Singapore

In Singapore, initiatives aimed at addressing the role of diet in preventing non-communicable chronic diseases began during the 1980s with the release of dietary guidelines in 1988 for Singaporeans aged 2 years and above (Lee, 2011). To aid the public in making healthier food choices, a Healthy Diet Pyramid was subsequently introduced in 1995. Recognising that food-based guidelines were more helpful to Singaporeans than the nutrient-based guidelines, food-based dietary guidelines for adults aged 18-65 years were officially proclaimed in 2003 (HPB Singapore, 2003). There is a total of 8 key messages in the Singapore Dietary Guidelines. Each key message is accompanied by explanatory notes which include scientific rationale for the key message, food sources, advice to achieve the recommendation and a 'nutshell' section to summarise the recommendation. A frequently-asked-questions section is also included. The 2003 dietary guidelines are currently being revised, and the Singapore Health Promotion Board website has retained its 8 key messages for adult Singaporeans (18-69 years)(HPB Singapore, 2014). One major change in the website information is the introduction of the My Healthy Plate. Nonetheless, this compilation and analysis is still based on the 2003 dietary guidelines.

Thailand

Dietary guidelines based on 5 food groups served as the main nutrition education tool in Thailand until 1996 when the FBDGs were published after two years of formulation and development (Sirichakwal & Sranacharoenpong, 2008; Sirichakwal, Sranacharoenpong & Tontisirin, 2011). The current Food-Based Dietary Guidelines for Thai people consist of 9 key recommendations for a healthy population aged 6 years and above (MOPH Thailand, 1998). Each of the key messages

is accompanied by paragraphs explaining the terms used, principles and rationale underlying the dietary recommendation and sources of the food groups. The guidelines were developed with Thai food habits and culinary culture in mind and supported by scientific evidence. The publication is meant to create public awareness about these guidelines and offer suggestions for improving one's diet. At the end of the booklet, a user 'self-evaluation of Thai Food-Based Dietary Guidelines' section is provided for use by consumers and for cooks or those who prepare food to evaluate their food intake patterns and cooking practice/methods, make suitable modifications, and then continually monitor their diets.

To promote greater understanding of the dietary guidelines for Thai people, a food guide model in the form of a 'Nutrition Flag' was published (MOPH Thailand, 2001). It provides suggestions for the kind and amount of foods to be consumed each day. The recommended amounts of foods are given in household units with various food choices for each food group according to three levels of energy requirements: 1600, 2000 and 2400 kcal. A user 'self evaluation' table for the amount of each food group consumed daily is provided at the end of this manual.

There have been various other activities on food-based dietary guidelines in Thailand. In 2009, a set of guidelines for Thai infants and young children was published with 10 messages. Examples of menu and nutritive values are shown in the last section (Suthutvoravut, Tantracheewathorn & Khunsanong (2009). A draft report of dietary guidelines for the Thai elderly has been presented and is being edited for publication (Sirichakwal, 2015). The Thai Ministry of Public Health is planning to carry out a qualitative and quantitative revision of the Thai FBDGs, in 2016.

Table 1. Key messages identified in the FBDGs of six Southeast Asian countries

Topic	Indonesia (14/17)	Malaysia (14/17)	Philippines (12/17)	Singapore (8/17)	Thailand (11/17)	Vietnam (13/17)
1 Variety of foods	√	√	√	√	√	√
2 Fruits & vegetables	√	√	√	√	√	√
3 Salt	√	√	√	√	√	√
4 Fats & oil	√	√	√	√	√	√
5 Sugar	√	√	√	√	√	√
6 Healthy body weight	√	√	√	√	√	√
7 Fish, lean meat, poultry, eggs, beans or nuts	√	√	√	X	√	√
8 Cereals & grains	√	√	X	√	√	X
9 Milk & milk products	X	√	√	X	√	√
10 Physical activity	√	√	√	X	X	√
11 Food safety	X	√	√	X	√	√
12 Alcohol	X	X	√	√	√	√
13 Water	√	√	X	X	X	√
14 Breastfeeding	X	√	√	X	X	√
15 Food and nutrition labels	√	√	X	X	X	X
16 Breakfast	√	X	X	X	X	X
17 Personal hygiene	√	X	X	X	X	X

Notes. The numbers in parentheses in the row header indicate number of topics present in the FBDG of each country. The ticks and crosses in the table indicate the presence or absence respectively of each topic in the country FBDG

Vietnam

Vietnam published a set of food-based dietary guidelines in 1995. Revised versions were published in 2001, 2006 and 2013 (Hop, Van & Thanh, 2011). The present Vietnam Food-Based Dietary Guidelines called '10 tips on proper nutrition for period 2013–2020' consist of 10 key messages. An English version of the complete Vietnam FBDG is not available however; notes for the comparisons in this paper were provided by one of the authors (Hop, 2015).

A summary of the format and number of key messages in the six FBDGs are provided in Appendix 1.

Comparison of the FBDG key messages

A total of 17 topics was identified, ranging from eating a variety of foods, specific food

groups, healthy body weight, physical activity, breastfeeding, reading food labels and food safety. The presence or absence of key messages for these topics in the FBDGs of the six Southeast Asian countries is indicated in Table 1. The topics are listed in the table in descending order of their presence in the number of countries studied. The six topics that are common to all six countries in this study are listed on the top part of the table. This is followed by a single topic present in five of the countries. Five topics that are found in four of the countries, followed by three topics adopted by three countries are then tabulated. A topic found in two countries is next listed. The last two topics are found in only one of the countries.

For each topic, the key messages and scientific rationale in the FBDGs of the

six countries studied are summarised in the following paragraphs. The similarities and differences in the wordings used are pointed out. The actual wordings of the key messages from the country FBDGs and a summary of the scientific rationale for the respective message are given in Appendix 2.

Topic 1: Variety of foods

All six countries surveyed have included a message on eating a variety of foods. The words used are rather similar: eat/enjoy a variety of foods; eat diversified meals. The scientific rationales provided by the six countries are rather similar: each type of food provides different nutrients; hence the body needs a variety of foods to obtain the required nutrients. In addition to nutrients, Indonesia and Singapore also referred to the supply of “other healthful substances” through a variety of foods

Topic 2: Fruits & vegetables

All six countries encourage eating plenty of/more fruits and vegetables everyday/regularly, in their dietary guidelines. All countries supported this recommendation by explaining that fruits and vegetables are good sources of various vitamins, minerals and dietary fibre. Malaysia, Singapore and Thailand also emphasise the presence of phytochemicals in fruits and vegetables. The presence of these micronutrients, fibre and phytochemicals are said to be protective against non-communicable diseases such as type 2 diabetes, cardiovascular diseases, hypertension and certain types of cancers. All countries use this as the scientific basis for including this key message of promoting more fruits and vegetables in the dietary guidelines.

Topic 3: Salt

FBDGs in all the six countries have included a message on salt intake. Malaysia and Singapore FBDGs have the same key message for salt intake: choose and prepare

foods with less salt and sauces. FBDGs of Indonesia, Thailand and Vietnam use the words: limit intake of food high in salt, avoid excessive intake of salty foods and do not use too much salt, respectively. The FBDGs of Philippines and Vietnam also specifically recommend the use of iodised salt to prevent iodine deficiency disorders.

All the six countries provided the same scientific basis for recommending reduction of salt intake. Excessive intake of salt/salty foods is associated with high blood pressure which in turn increases risk of stroke and cardiovascular diseases. The FBDGs of Singapore and Thailand also refer to a higher risk of stomach and nasopharyngeal cancers with excessive salt intake. Reducing the average salt intake of the population is likely to decrease the health burden associated with high blood pressure.

Topic 4: Fats and Oil

All countries surveyed have cautioned against the excessive intake of foods high in fats and oil. The FBDGs of Indonesia, Malaysia and Philippines recommend limiting the intake of foods high in fat while the Singapore FBDG recommends choosing and preparing food with less fat, especially saturated fat. The FBDGs Malaysia, Thailand and Singapore also advise a total fat intake of no more than 30% of the total dietary energy intake.

The basis of the recommendation to reduce fat intake given in the FBDGs of Malaysia, Singapore and Thailand is that excessive fat intake leads to overweight and obesity, which in turn increases the risk of degenerative diseases. FBDGs of all the countries studied, except Indonesia, also mentioned that a diet high in saturated fat increases risk of coronary heart disease and stroke.

Topic 5: Sugar

A message on sugar intake is included in the dietary guidelines of all six countries.

Most of the countries use the words: limit intake/avoid excessive intake of food high in sugar/sugar rich foods/sweet foods; limit the consumption of soft drinks and sweets. Malaysia and Singapore use the words: consume foods and beverages low in sugar and choose beverages and food with less sugar, respectively.

The scientific rationale provided by the countries is rather similar: excessive intake of sugary foods/beverages promotes dental caries; contributing towards excess energy intake which can cause weight gain/obesity – the risk factors for other diseases such as type 2 diabetes, heart diseases and high blood pressure. Singapore and Malaysia also state that excessive sugar intake lowers consumption of more nutritious foods and displaces micronutrient-dense food from the diet.

Topic 6: Healthy body weight

All six countries have similar recommendations on key message of healthy body weight: maintain/attain normal/appropriate body weight; maintain body weight in a healthy/normal range. The explanatory notes of most of the countries also recommend maintaining body weight through a healthy diet and regular physical activity.

In the scientific rationale provided, the majority of the countries pointed out that maintaining a normal/healthy weight helps to reduce overweight and obesity, which subsequently minimises the risk of many chronic diseases such as hypertension, diabetes, heart disease and cancer. Most of the countries also highlighted the undesirable health effects of underweight, e.g. anaemia, low bone mass, increased risk of infection, irregular menstruation in females and infertility.

Topic 7: Fish, meat, poultry, eggs & legumes

FBDGs of all countries, except Singapore, included a key message on the importance of consuming fish, meat, poultry, eggs and legumes. Indonesia and Vietnam used the

words 'eat foods that are high in protein/protein-rich foods' whereas Malaysia, Philippines and Thailand used similar words such as 'consume fish, meat/lean meat, poultry, eggs and legumes'. The scientific basis given by these countries is that foods in this group provide several essential nutrients, including protein, B vitamins, iron and zinc. All the six countries also included legumes and products in this food group so as to encourage consumption of plant protein sources. Malaysia and Philippines included nuts as well in this key message.

The FBDG of Philippines recommends eating these foods daily for growth and repair of tissue. The Thai FBDG recommends eating these foods regularly as they help in growth, immune functions and body maintenance. The Malaysian FBDG also recognises the importance of consuming foods in this group to prevent nutrient deficiencies. However, it also advises the avoidance of excessive intake of some foods in this group as they are high in saturated fat and/or cholesterol.

Topic 8: Cereals & grains

Indonesia, Malaysia, Thailand and Singapore included a message on consumption of cereals and grains with similar key words: eat adequate amounts/variety of rice, grains/staple food. Malaysia and Singapore specifically highlighted the importance of consuming whole grains in their key message. Both these countries suggested choosing at least half of the grain products from whole grains. The key message of the Indonesian FBDG does not use the term whole grain. However, the supporting message in prescribing the intake of carbohydrates provided by staple foods, encourages the consumption of whole grain cereals. The FBDG of Thailand also does not use the term whole grain, but the supporting message encourages the consumption of 'home-pounded' rice or undermilled rice. The FBDGs of Philippines and Vietnam do

not include a specific message on cereals and grains.

Similar scientific rationales are used to explain the intake of foods in this group, i.e., cereals and grains are the major dietary sources of energy. Indonesia, Malaysia, Singapore and Thailand also explained the importance of consuming more whole grain or undermilled grains, highlighting that unrefined cereals and grains are great sources of vitamins, minerals, fibre and phytochemicals.

Topic 9: Milk & milk products

The FBDGs of Malaysia, Philippines, Thailand and Vietnam included a specific message promoting consumption of milk and milk products but not the FBDGs of Indonesia and Singapore. Similar words are used for the key message: consume adequate/sufficient amounts of milk and milk products.

In the Indonesian FBDG, consumption of milk and milk products is included in the food group of animal foods with the key message 'consume foods that are high in protein'. In the Singapore FBDG, consumption of milk and milk products is embedded in the first key message of enjoying a variety of foods.

The scientific basis provided by most countries for having this key message is that milk and milk products are a rich source of several essential nutrients, including protein, vitamin A and D. The FBDGs of Malaysia, Philippines and Thailand also highlighted that these foods contain calcium which is important for building and maintaining bone mass.

Topic 10: Physical activity

Indonesia, Malaysia, Philippines and Vietnam included a key message on physical activity in the dietary guidelines with similar wordings: 'Be physically active; do adequate/increase physical activities.' The FBDGs of Singapore and Thailand do not have a separate key message on physical activity but there is a

brief discussion on health benefits of regular physical activity and advice on physical activity in the message on achieving and maintaining ideal body weight.

The rationale provided in the countries' FBDGs are similar. Regular physical activity burns off excess energy thereby assisting weight control or reduction. It also helps improve blood circulation, muscle tone and the efficiency of heart and lungs. It is able to assist one to relax, cope with stress, and promotes sound sleep. Exercise enhances psychological well-being, improves self-esteem, and maintains motivation. Physical activity is therefore important for the health and well-being of people of all ages and is an important factor in enhancing health and reducing the risk of various chronic diseases.

Topic 11: Food safety

Malaysia, Philippines, Thailand and Vietnam have their respective key message on food safety in the FBDGs. Similar wordings are used: Consume safe and clean foods and beverages or eat clean and uncontaminated food or ensure food safety rules in food selection, processing and preserving.

The scientific rationale provided for this key message is rather similar for the four countries. Food and water are essential to life, but they may also carry disease-causing organisms like bacteria, viruses, fungi and parasites, or harmful chemical substances. Consuming such contaminated food and beverages causes food poisoning and other gastrointestinal diseases, resulting in serious morbidity and mortality consequences and significant economic losses. Proper food choice, preparation, storage and cooking can prevent most food-borne illnesses.

Topic 12: Alcohol

Philippines, Singapore, Thailand and Vietnam FBDGs recommend avoiding or to reduce/limit the consumption of alcoholic beverages. Indonesian and Malaysian

FBDGs do not have a key message on alcohol consumption.

The ill effects of excessive alcohol intake on nutritional status and health form the basis of this key message for all the four countries. Excessive consumption of alcoholic beverages may lead to nutrient deficiencies as well as to numerous other serious health problems, including cirrhosis of the liver, weight gain and related chronic diseases. Excessive alcohol consumption alters an individual's judgement and this may cause motor and industrial accidents, violence, suicide, social and psychological problems.

Topic 13: Water

Indonesia, Malaysia and Vietnam FBDGs included a message on drinking adequate amounts or plenty of water. In addition, the Indonesian FBDG highlights drinking water that is free from contamination while that of Vietnam emphasises drinking boiled water. Philippines and Singapore FBDGs do not have a separate message on drinking water. However, in their message on eating a variety of foods, the importance of drinking water is emphasised.

The scientific rationale provided to support this message on water intake is similar for all the countries. Water is the principal chemical constituent of the human body and is needed for a number of vital metabolic processes in the body. It is the most essential of all nutrients.

Topic 14: Breastfeeding

A message on promoting breastfeeding is included in the dietary guidelines of Malaysia, Philippines and Vietnam. The message by the three countries is similar, i.e., to practise exclusive breastfeeding from birth until six months and continue to breastfeed until the child is two years of age. The FBDGs of Philippines and Vietnam also included the need to provide proper complementary feeding when the baby is 6 months of age.

Clear benefits of breastfeeding for both

child and mother constitute the scientific rationale for this key message. Exclusive breastfeeding provides the essential nutrients a baby needs to grow and develop normally. It also reduces mortality and morbidity from infectious disease and decreases rates of sudden infant death syndrome. Important benefits have also been described for mothers, which include more likely return to pre-pregnancy weight as well as reduced risk to various health problems, including decreased risk of breast cancer and ovarian cancer.

Topic 15: Food and nutrition labels

Only Indonesia and Malaysia have included a message on reading food and nutrition labels in their dietary guidelines. The message in the Indonesian FBDG is stated as: 'Read the food labels of packaged foods.' The message in the Malaysian FBDG is focused on nutritional aspects of the food label: 'Make effective use of nutrition information on food labels.'

The two countries have provided similar basis for providing this recommendation. Information on food labels, including nutrient content, helps consumers make better food choices when planning daily meals. The Malaysian FBDG message is focused on nutrition labelling, and nutrition and health claims. On the other hand, the Indonesian FBDG message is broader, including ingredients, expiry date and contaminants in the prepackaged foods.

The FBDG of Thailand does not have a separate key message on nutrition labeling but there is a brief discussion in the appendix on how to read the nutrition information on the food package and use the information to make better food choices.

Topic 16: Breakfast

Only the Indonesian FBDG has included a key message: 'Eat breakfast regularly.' The FBDG explains that the message is included as many Indonesian people do not

have the habit of consuming breakfast. Not having breakfast would adversely affect the learning process in schools for school children, may reduce physical activity, increase the risk of unhealthy snacking and increase risk for obesity in adolescents and adults.

Topic 17: Personal hygiene

Only the FBDG of Indonesia has included a key message on personal hygiene: "Wash hand with soap and clean running water."

The message is included to emphasise that washing hands properly is to maintain overall cleanliness and to prevent bacteria from spreading from the hands to the food that is to be consumed and to prevent our body from being exposed to bacteria. The explanatory notes also recommended the use of special hand washing soap either in the form of bars or liquids to ensure maximal cleanliness of the hand.

DISCUSSION

Comparison of key messages in the FBDGs

Examining the 17 topics compiled from the FBDGs of six Southeast Asian countries, finds more similarities than differences in these key messages. Six of the topics are present in all the countries studied, namely consume a varied diet, consume more fruits and vegetables; reduce intake of salt, fat and oil; and the importance of maintaining healthy body weight. Another six topics are found in four of the countries studied, namely consume cereals and grains as the main source of energy; consume sufficient milk and dairy products; consume fish, lean meat, poultry, eggs and legumes; be physically active; consume safe foods and beverages; and avoid or reduce intake of alcoholic beverages.

There are also a few significant differences between the key messages in these guidelines. Three of the topics are only found in one or two country FBDGs, namely eat breakfast regularly, read food

and nutrition labels and importance of personal hygiene.

In addition, the scientific rationale used by the countries to substantiate the key messages are rather similar for almost all the topics. It is also noted that countries have generally established the rationale based on scientific evidence. Most countries also have made efforts to document the scientific basis used. It is desirable that a uniform set of dietary messages, based on available scientific information, be used by all healthcare professionals in a country. This will enable uniform messages to be disseminated to the general population.

It is not surprising that there are general similarities in the key messages in the FBDGs in the six countries studied. This is because countries in the South-east Asian region share similarities in terms of background, socio-demographic characteristics, cultural heritage and a dietary pattern. All countries in the region have undergone significant socio-economic development in the past decades. This has resulted in marked changes in lifestyle of the population, including qualitative and quantitative changes in the diet as well as reduced physical activity. Countries in the region now face similar problems of the double burden of malnutrition, with undernutrition affecting some segments of the population whilst over-nutrition is afflicting an increasing proportion of the population (Soon & Tee, 2014).

In addition, the general similarities in key messages are also probably because countries refer to often-used international references, especially publications of the World Health Organization and Food and Agriculture Organization. It is also probable that countries refer to the FBDGs of other countries when drafting their own official guidelines.

The key messages in the FBDGs reviewed are reflective and pertinent to the prevailing nutrition issues in the respective countries. The general similarities in the nutrition problems

facing communities in the region suggest potential for collaboration in implementing intervention programs. This compilation of the key messages provides insights into how the six countries word their key messages and the scientific basis for the recommendations. Information presented should be useful for countries intending to establish new guidelines or review their FBDGs. Based on various considerations, including prevailing socio-economic condition, dietary pattern, health and nutrition situation and current level of nutritional sciences knowledge, a periodic review of FBDGs need to be undertaken.

Ensuring effective dissemination and implementation of FBDGs

Countries in the region do recognise the importance of empowering the community with appropriate knowledge in food and nutrition through a set of food-based dietary guidelines. The majority of the countries in Southeast Asia have established such guidelines and the other countries are making efforts to do so.

It is however imperative that the developed FBDGs be widely disseminated to all stakeholders and their participation in spreading the messages to the public is encouraged. Furthermore, to ensure effective implementation of FBDG messages, health literacy of the other stakeholders in interpreting the meaning of the dietary guidelines should be studied. The relevant healthcare professionals in both the public and private sectors must be sufficiently familiar with the guidelines and utilise these to provide uniform messages to the public. These would certainly include allied health professionals especially nutritionists, dietitians and nursing staff who frequently give advice to the public on food and nutrition. It is however vital that doctors should also be participating in disseminating dietary guideline messages, especially general practitioners and family doctors as they interact with the public.

Professional bodies such as nutrition

and dietetic societies/associations have traditionally been playing an active role in disseminating dietary guideline messages. These organisations can partner with other stakeholders, including the private sector and government agencies, to reach out to the public with a variety of approaches. Non-governmental organisations should also be encouraged to disseminate dietary guideline messages to various segments of the community. These could include women organisations and youth groups.

The private sector, including the food industry and the fitness and wellness centres do provide food and nutrition advice to the public. These organisations should be encouraged to use the national FBDGs for their educational activities rather than relying on materials that they pick up from different sources. The regulatory authority can consider allowing the food industry to include the official key messages of FBDGs on their food labels. However, this should be carried out in accordance with the criteria in the Codex guidelines on nutrition and health claims (FAO/WHO, 2013). These messages should not be disguised as health claims of company products.

Dietary guidelines should be disseminated to the young generation in order to establish healthy lifestyle practices from a young age. An excellent channel of passing on dietary guidelines would be the schools. Realising that teachers may not be burdened with the additional role of teaching nutrition to school children, nutrition messages need not be imparted through formal school curriculum. It would be more impactful if nutritionists are assigned to disseminate FBDG messages through specifically developed nutrition education modules (Tee *et al.*, 2013). These nutritionists should also be assigned to conduct all nutrition related activities in schools, including monitoring of body mass index of the children.

Much less effort has been made into ensuring that there is sufficient

understanding and utilisation of the messages by the community. Future work on FBDGs should therefore focus on ensuring effective communication and adoption of these messages. Effective messaging must result in positive behaviour lifestyle changes of the community. We must first determine if our messages do reach those who are most in need of these kinds of advice. We need to know if consumers understand the messages, and how they perceive and interpret the messages. We need to gauge if and how they utilise the messages. We need to ensure that our messages are locally relevant and appropriate and can be put into practice. There is a need to find communication channels to effectively reach out to different segments of the population. While print media would still be necessary for some purposes, it is vital to explore utilising newer approaches including the Internet and social media.

Indeed, to optimise the formulation and communication of appropriate and effective FBDG messages, through all channels, from schools, to clinics, to mass media, the collaboration of communication and social marketing experts can be critical for achieving the intended results. This will entail, amongst others, a detailed analysis of nutrition and health problems of the target population.

CONCLUSIONS

It is generally recognised that empowering the public with appropriate nutrition knowledge is the long term solution to reducing the twin faces of malnutrition in the country. Countries generally realise that the first step towards this end is the establishment of a set of dietary guidelines, developed through consensus and based on current understanding of nutrition science. Countries in the Southeast Asian region do recognise this importance. The majority of the countries in the region have established food-based dietary guidelines

and the other countries are making efforts to do so.

Examining the 17 topics compiled from the FBDGs of six Southeast Asian countries, it was found that there are more similarities than differences in these key messages. Twelve of these messages were found in at least four of the country FBDGs studied. Nevertheless, there are also a few significant differences between the key messages in these guidelines. In addition, this study showed that the scientific rationale used by the countries to substantiate the key messages are rather similar for almost all the topics.

The similarities in the key messages noted in this Supplement would suggest that there could be greater sharing among the countries in the region in the area of FBDGs. This would include sharing of approaches to development of a national FBDG, selection of key messages, establishing effective messages and sources for scientific rationale. More importantly, collaboration in the effective dissemination, promotion and implementation of FBDGs would be useful for countries in the region. In addition, future work could be undertaken to compile and analyse the FBDGs for specific population groups that have been or are being developed by several countries in the region.

The Southeast Asia Public Health Nutrition Network will continue to provide a platform for all stakeholders, from the public and private sectors, to deliberate and share their experiences in FBDGs.

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Conflict of interest

The authors declare that they have no conflict of interest in undertaking this work.

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Appendix 1. Number of key messages and format of FBDGs

Country	Name of FBDG and year published	No. of Key Messages	Format of FBDG
Indonesia	Pedomani Gizi Seimbang 2014 (Guide to Balanced Nutrition)	10	The main messages are for healthy adults in the general population. In addition, specific guidelines for various physiological groups are given (namely pregnant women, lactating women, infants, children, teenagers and the elderly). Explanatory notes are contained within each message, including scientific rationale. A separate chapter discusses the main principles of balanced nutrition, focusing on four pillars, namely eating a variety of foods; practising personal hygiene; being physically active; and monitoring body mass index regularly. The <i>Pedomani Gizi Seimbang</i> also has a section on slogans and visuals where pictorial guides in the form of a <i>tumpeng</i> on balanced nutrition and a food plate are explained. There is also a section on FBDG's communication, information and education strategies and implementation. Useful appendices on recommended dietary allowance for macronutrients and micronutrients are also included.
Malaysia	Malaysian Dietary Guidelines 2010	14	Each key message has its respective explanatory sub-sections including terminology used, introduction, scientific basis for the key messages, and the current status of the population's practices related to the key message. Besides, each key message has its respective key recommendations followed by advice on 'how to achieve' each of the recommendations. For some relevant key messages, a section of additional recommendations is included for specific groups of population or conditions, for example children and adolescents, pregnant and lactating women and the elderly. A food pyramid is presented in key message 1 on eating a variety of foods. In key message on physical activity, an activity pyramid is provided. Where appropriate for the key message, useful appendices have also been included to provide more details.
Philippines	2012 Nutritional Guidelines for Filipinos	10	Each key message is explained in individual chapters. Each chapter includes a write-up on the scientific rationale for the key message. For messages related to food groups, information is given on the role of the relevant foods, sources and functions of the foods and associated nutritional deficiencies or excesses. There is also a frequently-asked-questions section to clarify the common questions related to the key messages. For other messages such as breastfeeding, food safety, body weight and physical activity, the scientific rationale for these recommendations are given. At the end of each chapter, an action plan section is included to summarise the tips to achieve the recommendations. Where appropriate, the key message also includes recommendations for specific age groups (children & adolescents, adults, pregnant & lactating women, older persons) as well as their special nutrition concerns.

Appendix 1. Number of key messages and format of FBDCs— Continued

<i>Country</i>	<i>Name of FBDC and year published</i>	<i>No. of Key Messages</i>	<i>Format of FBDC</i>
Singapore	Dietary Guidelines 2003 for Adult Singaporeans	8	Each key message is described by explanatory paragraphs which include scientific rationale for the recommendation, current status of the population's practices related to the key message, relevant pictorial guide, food sources, tips to achieve the recommendation, summary of the recommendation (in a nutshell section) and a frequently-asked-questions section to clarify common questions related to the key messages. The 2003 FBDC are being revised with a web version uploaded in 2014 which has retained the 8 key messages, with brief explanatory notes. One major change in the website information is the introduction of the My Healthy Plate
Thailand	Food-Based Dietary Guidelines for Thais 2000	9	Each of the key recommendation is accompanied by explanatory paragraphs explaining the terms used in the key messages, principles and rationale underlying the dietary recommendation, sources of the food groups and how to achieve the key recommendation. A user 'self-evaluation of Thai Food Based Dietary Guidelines' section with practical instructions and scientific evaluation for daily dietary practice is included at the end of the guideline. The users can evaluate their own eating behaviours and other related practices by checking on the frequency of practices (regular, occasionally or never) on 26 eating and related behaviours and 11 food preparation behaviours.
Vietnam	10 Tips on Proper Nutrition for Period 2013–2020	10	An English version of the complete Vietnam FBDC was not available. The key messages are as follows: <ol style="list-style-type: none"> 1. Eat diversified meals that include all 4 food groups: carbohydrates, protein, lipid, vitamins and minerals. 2. Eat protein-rich foods in a good balance of vegetable and animal sources. Increase the intake of shrimp, crab, fish and beans/peas. 3. Eat appropriate amounts of fats/oils in a good combination. Sesame and peanut are recommended. 4. Do not use too much salt. Iodised salt is recommended. 5. Eat vegetables and fruits every day. 6. Ensure food safety rules in food selection, processing and preservation 7. Drink adequate boiled water everyday. 8. Initiate breastfeeding right after birth, exclusively breastfeed in the first 6 months, then start proper complementary feeding and continue breastfeeding up to 24 months. 9. Children over 6 months of age and adults are recommended to consume milk and dairy products appropriate to each age. 10. Increase physical activities, maintain appropriate weight, abstain from smoking, and limit the consumption of alcoholic / soft drinks and sweets.

Appendix 2. Key messages and scientific rationale according to topics
Topic 1. Variety of foods

Country	Key Message	Rationale
Indonesia	Enjoy a variety of foods (<i>Syukuri dan nikmati anekaragam makanan</i>).	The quality or nutritional quality and completeness of nutrients is influenced by the diversity of types of food consumed. It is easier to meet the nutritional needs with more diversity of the types of food consumed. In addition, with the consumption of a variety of foods, the body can obtain various other substances that are beneficial to health. Therefore consumption of a variety of foods is one of the important ways of having balanced nutrition. It is also important to be aware of food safety, i.e., the food and beverages must be free from biological, chemical as well as other contaminations that will adversely affect or endanger health.
Malaysia	Eat a variety of foods within your recommended intake.	Different foods provide different combinations of energy, nutrients and other healthful food components. The best way to meet the daily requirements is to eat a balanced, moderate and varied diet that combines cereals, fruits and vegetables, meat, fish, poultry, legumes and dairy products.
Philippines	Eat a variety of foods every day to get the nutrients needed by the body.	There are more than 40 essential nutrients that the body needs to function well. These nutrients team up in special ways and depend on each other. Thus, we need all these essential nutrients. No single food can provide all the nutrients the body needs. Eating a variety of foods from all the different food groups in the proper amounts and balance will supply the required nutrients that the body needs
Singapore	Enjoy a variety of foods using the Healthy Diet Pyramid as a guide.	Different types of food contain different nutrients and other healthful substances. No single food can supply all the nutrients in the amounts that an individual needs each day. To get all the nutrients and other substances needed for optimal health, every adult is encouraged to use the Healthy Diet Pyramid to guide food choices. Food eaten daily should come most from the base and least from the tip of the Healthy Diet Pyramid. Food is to be selected every day from each of the four basic food groups: rice and alternatives, fruits, vegetables and meat and alternatives. While food items within the same food group are similar in content for key nutrients, they do differ in their content of other nutrients and beneficial substances. Therefore, it is best to select a variety of food from within each food group as well.

Topic 1. Variety of foods — Continued

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Thailand	Eat a variety of foods from each of the 5 food groups and maintain proper weight.	Each type of food is composed of many nutrients such as protein, carbohydrates, fat, minerals, vitamins, water as well as dietary fibre, which helps the body function properly. The nutrient content in different types of foods often varies. Hence no single food can supply all of the nutrients in their proper amounts that your body requires. Hence, to obtain all the essential nutrients in adequate quantities as required by your body, you need to eat a variety of foods from each of the five main food groups.
Vietnam	Eat diversified meals that include all 4 food groups: carbohydrates, protein, lipid, vitamins and minerals.	The human body requires daily nutrient intakes to survive and carry out daily activities. Nutrients are provided by 4 food groups: carbohydrates (e.g. rice, wheat, corn, potato, cassava); protein (e.g. meat, fish, eggs, milk, beans); lipid (e.g. oils, butter, fats, sesame, peanut); vitamins and minerals (vegetables, tubers and fruits). Each type of food provides certain nutrients; therefore we should combine and eat a variety of foods from all food groups.

Topic 2. Cereals and grains

Country	Key Message	Rationale
Indonesia	Eat a variety of staple foods (<i>Biasakan mengonsumi anekaragam makanan pokok</i>).	Staple food is any food containing carbohydrate and is often consumed or has become a part of dietary cultures of various ethnic groups in Indonesia for a long time. Examples of carbohydrate foods are rice, maize, cassava, sweet potato, taro, garut, sorghum, millet and sago and their products. Besides containing carbohydrate, these staple foods usually also contain vitamins B1 and B2 and some minerals. Minerals in these staple foods usually have a lower biological value. Whole grain cereals such as corn, brown rice, black rice, or grains that are not milled have high fibre content. Fibre is important for regulating bowel movement and controlling blood cholesterol. In addition, cereals also contain carbohydrate which is slowly converted to sugar, thereby helping to prevent high blood sugar. Some types of tubers also contain non-nutritional substances that are beneficial to health such as purple sweet potato and yellow sweet potatoes that contain anthocyanin. Consuming more than one type of staple food per day or per meal is an important way of ensuring intake of a variety of staple foods.
Malaysia	Eat adequate amounts of rice, other cereal products (preferably whole grain) and tubers.	Cereals and cereal-based products are the most important source of food and provide the major source of energy and protein. Eating enough cereal foods helps to ensure adequate nutritional intake. Among the staples, rice has the highest energy and protein digestibility. Other than being an excellent source of carbohydrate and protein, whole grain cereals are important sources of fibre, vitamins, minerals, lignans and other phytochemicals. Tubers have higher protein quality, low fat, high moisture and high fibre content than other cereals.
Philippines	No specific message on cereals and grains, but the message on "eating a variety of foods everyday" provides information on various food groups. One of these is "rice and alternatives."	Rice, and in some areas, corn are the staple Filipino foods. Bread and other bakery products, cereals such as oatmeal, together with root crops, such as potato, sweet potato, <i>gabi</i> , <i>ube</i> and cassava and taro, belong to this food group. These foods supply the major bulk of carbohydrates and energy to the diet. They also provide dietary fibre as well as some protein, vitamins and minerals.

Topic 2. Cereals and grains — Continued

Country	Key Message	Rationale
Singapore	Eat sufficient amounts of grains, especially whole grains.	Food items made from grains provide carbohydrates (starch), dietary fibre, vitamins, minerals and phytochemicals that are important for good health. These food choices also provide the main source of energy for our daily activities. Contrary to the popular belief that grains are fattening, grain products are naturally low in fat, unless fat is added during processing, preparation or at the table. Whole grains have more vitamins (vitamins B and E), minerals (iron, zinc and magnesium), dietary fibre and phytochemicals than refined grains. Eating good amounts of fibre-containing food such as whole grains (as well as fruit, vegetables and pulses) promote healthy bowel function. Whole grains are more satiating due to the higher fibre content. A diet rich in whole grains can help prevent heart disease, stroke and certain cancers.
Thailand	Eat adequate amounts of rice or alternative carbohydrate sources.	Rice, a source of energy, is the staple food of the Thai people. The main nutrients in rice are carbohydrate and protein. Unpolished rice or home pounded rice is more nutritious than highly milled rice (polished rice) because it contains substantial nutrients such as protein, fat, dietary fibre, minerals and vitamins. There are several rice and cereal products which can also be sources of energy, e.g. rice noodles, fermented rice noodles and wheat noodles. Rice and starchy foods should be consumed daily and in appropriate quantities. If they are eaten in excess of what the body requires, they can transform into fat that is deposited in the body's internal organs, thus leading to obesity. They should be eaten along with a variety of other foods from the 5 food groups in amounts proportionate and adequate to your body's requirements.
Vietnam	No specific message, but included in message number 1 "eating a variety of 4 food groups everyday."	Rice is the main staple food of the Vietnamese people; Eat adequate amounts of rice and other staple foods.

Topic 3. Fruits and vegetables

Country	Key Message	Rationale
Indonesia	Eat plenty of vegetables and sufficient fruits (<i>Banyak makan sayuran dan cukup buah-buahan</i>).	In general, vegetables and fruits are sources of various vitamins, minerals and dietary fibre. Some vitamins and minerals contained in vegetables and fruits act as antioxidants or antidote to toxic compounds in the body. Fruits also provide carbohydrates especially in the form of fructose and glucose. Certain vegetables such as carrots and potatoes also provide carbohydrates. Some fruits also provide unsaturated fats such as those found in avocado and red fruit. Therefore, the consumption of vegetables and fruits is important for achieving balanced nutrition. Adequate consumption of fruits and vegetables also play an important role in maintaining a healthy level of blood pressure, blood glucose and cholesterol. It also helps in reducing risk to constipation. It can be concluded that adequate consumption of vegetables and fruits play a role in the prevention of chronic non-communicable diseases.
Malaysia	Eat plenty of fruits and vegetables everyday.	An increasing number of high quality scientific studies have demonstrated the specific health benefits of consumption of fruits and vegetables to several chronic diseases such as type 2 diabetes mellitus, cardiovascular diseases and cancers. These beneficial effects have been attributed to the presence of vitamins, minerals, dietary fibre and a variety of bioactive components in fruits and vegetables.
Philippines	Eat more vegetables and fruits everyday to get the essential vitamins, minerals and fibre for regulation of body processes.	In general, most people do not eat enough green leafy and yellow vegetables, and vitamin-C rich fruits, as indicated by results of food consumption surveys conducted by the FNRI. Vegetables and fruits are rich sources of micronutrients such as vitamin A, C and E as well as calcium, iron, dietary fibre and phytochemicals. Vegetables and fruits play important roles in regulating body processes; they are co-factors in growth and development. Including these foods into the diet may help correct micronutrient deficiencies such as vitamin A, iron and iodine and may help prevent obesity and non-communicable diseases such as diabetes, heart diseases and some forms of cancer.
Singapore	Eat more fruits and vegetables every day.	Vegetables and most fruits are fat-free. In addition, fruits and vegetables provide essential vitamins, minerals and other phytochemicals (beneficial plant substances) such as flavonoids and carotenoids that are beneficial for health. Fruits and vegetables also contain soluble fibre and insoluble fibre. Soluble fibre helps lower blood cholesterol and insoluble fibre provides bulk to promote healthy bowel function. Scientific studies show that a diet rich in fruits and vegetables can lower risk of developing heart disease, stroke and certain types of cancer by 20–30%.

Topic 3. Fruits and vegetables — Continued

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Thailand	Eat plenty of vegetables and fruits regularly.	Vegetables and fruits are good sources of vitamins, minerals and other useful substances which are necessary for good health. Fibre in vegetables and fruits helps the body to remove waste as well as eliminate cholesterol and some carcinogenic compounds. Vegetables and fruits are generally low in calories. As a result, eating a variety of vegetables and fruits on a regular basis is one way to reduce the risk of obesity, coronary heart disease and cancers. The wide selection of vegetables and fruits available throughout the year should become a regular part of the Thai diet, and especially the diets of school children and adolescents in order to keep them growing strong and healthy.
Vietnam	Eat more vegetables and fruits every day.	Vegetables and fruits play an important role in our diet. Vegetables and fruits are rich in vitamins, minerals and fibres. Fibres help to remove waste as well as cholesterol from the body and help to prevent constipation.

Topic 4. Milk & milk products

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Indonesia	No specific message. Consumption of milk and milk products is included in the key message 'Consume foods that are high in protein'.	
Malaysia	Consume adequate amounts of milk and milk products.	Milk and milk products are a rich source of essential nutrients, including calcium, protein, retinol, riboflavin, vitamin D, vitamin B12, zinc, magnesium and potassium. Diets rich in milk and milk products help build and maintain bone mass throughout the life cycle, thereby reducing the risk of osteoporosis in later life.
Philippines	Consume milk, milk products, and other calcium-rich foods such as small fish and shellfish, everyday for healthy bones and teeth.	Calcium, together with protein and other nutrients particularly vitamin D, is essential for the formation of strong bones and teeth. Milk, milk products and small fishes are excellent sources of calcium and should form part of the daily diet starting in childhood to help prevent osteoporosis later in life. National nutrition surveys indicate a consistent failure of the Filipinos to meet dietary recommendations for calcium.
Singapore	No specific message. Milk is listed as an alternative under meat group.	

Topic 4. Milk & milk products — Continued

Country	Key Message	Rationale
Thailand	Drink milk in appropriate quantity and quality for one's age.	Milk is good for everyone. It is rich in calcium and phosphorus which are essential for building strong bones and teeth. Moreover, milk contains protein, lactose, and vitamins (especially vitamin B2), which promotes growth and proper functioning of body tissues. Pregnant women, school children, adolescents, adults and the elderly should drink milk along with adequate exercise in order to strengthen the bones and decrease bone resorption. Those who are lactose maldigester and intolerant with gastro-intestinal symptoms such as diarrhoea or abdominal bloating should start drinking milk in small amounts and thereafter gradually increase the serving; drink milk after a meal or switch to soy milk or cream yoghurt.
Vietnam	Children over 6 months of age and adults are recommended to use milk and dairy products appropriate to each age.	Milk has high nutritional value as it contains adequate protein, lipid, carbohydrates, vitamins and minerals. Milk intake is recommended for all age groups.

Topic 5. Fish, meat, poultry, eggs & legumes

Country	Key Message	Rationale
Indonesia	Consume foods that are high in protein. (<i>Biasakan mengonsumsi lauk pauk yang mengandung protein tinggi</i>)	Our diet should contain protein from both animal and plant sources. Animal protein sources include ruminant meat, poultry, seafood, eggs and milk and milk products. Plant protein sources include legumes and their products. Animal protein has a more complete amino acids profile and has better quality protein, vitamins and minerals that are more easily absorbed by the body. However, animal protein contains higher cholesterol (except fish) and fat. Fat in meat and poultry are mostly saturated fat. Cholesterol and saturated fats are necessary for the body especially in children but their intake must be limited in adults. Plant protein foods have a higher proportion of unsaturated fats. It also contains isoflavone which can function as an antioxidant and anti-cholesterol agent. However, protein and minerals from plant sources are of lower quality than those from animal sources. Therefore, in order to achieve a balanced diet, foods from both animal and plant sources should be consumed with other food groups every day so that the amount and quality of the nutrients consumed are better and complete.
Malaysia	Consume moderate amounts of fish, meat, poultry, egg, legumes and nuts.	Fish, meat, poultry, legumes and nuts provide nutrients (protein, B vitamins, iron, zinc, and magnesium) that are vital for health and maintenance of the body. In view of their nutritional value, it is important to include these foods in the daily dietary intake to prevent deficiencies of these vital nutrients. However, excessive intake of these foods should be avoided as some foods in this group (e.g. fatty cuts of meat, processed meat, duck) are high in saturated fat. Some foods in this group (e.g. egg yolk, and organ meats) are high in cholesterol.
Philippines	Consume fish, lean meat, poultry, egg, dried bean or nuts daily for growth and repair of body tissues.	Fish, meat, eggs, poultry, nuts and dried beans are rich sources of protein. Proteins from animal products (meat, fish, poultry and eggs) contain all the essential amino acids in correct proportions for the synthesis of body tissues and are considered of high biological value. Proteins found in plants, legumes, grains, nuts, seeds and vegetables lack the essential amino acids for the synthesis of body tissues. Protein is important for growth and development of children and the maintenance of body tissues in adults. In addition, animal foods are generally rich in preformed vitamin A, B-complex vitamins, heme iron and zinc. Results of food consumption surveys among Filipino households showed that only 63% of the households met the estimated average requirement for protein.

Topic 5. Fish, meat, poultry, eggs & legumes — Continued

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Singapore	No specific message, but the message on 'enjoy a variety of foods using the Healthy Diet Pyramid as a guide' provided brief information on various food groups. One of these is 'meats and alternatives'.	
Thailand	Eat fish, lean meats, eggs, legumes and pulses regularly.	Fish, lean meat, eggs, legumes and pulses are good sources of protein. We need good quality protein in sufficient amounts for the growth, function and maintenance of the body. Protein is also needed to improve immune response and supply energy. Fish also contains high amount of phosphorus. Small fish which can be eaten whole are good sources of calcium. In addition, marine fish are good sources of iodine. Frequent consumption of meat that has visible fat should be avoided. Eggs contain several essential minerals and vitamins. There is a variety of legumes and pulses and their products which can be regularly eaten as an alternative protein source to meat.
Vietnam	Eat protein-rich foods in a good balance of vegetable and animal sources. Increase the intake of shrimp, crab, fish and beans/peas.	Animal protein sources have a high biological value as they contain plenty of essential amino acids in good balance. However, animal foods contain higher cholesterol content. On the other hand, plant proteins lack several essential amino acids such as methionine and tryptophan, but they provide more lysine. Thus, protein-rich foods from both animal and plant sources should be consumed in combination, i.e., half from animal sources and half from plant sources.

Topic 6. Water		
Country	Key Message	Rationale
Indonesia	Drink adequate amounts of safe plain water. (<i>Biasakan minum air putih yang cukup dan aman</i>).	Water is one of the essential macro-nutrients. Therefore water is needed by the body in large amounts for a healthy life, but the body cannot produce water to meet these needs. About two-thirds of our body weight is water. The percentage of water in children is higher than that of adults. Hence water requirement for children is higher per kg body weight. Water is necessary for optimal growth and development. It functions as a regulator of biochemical processes and body temperature, serves as component of cells and organs, a medium for transporting nutrients and metabolic wastes, lubricates joints and serves as a cushion for organs. Water balance should be maintained by adjusting the amount of water input and output. Interference to water balance in the body can increase the risk of a variety of disorders such as constipation, urinary tract infection, bladder stones, acute kidney disorder and obesity. Several factors are known to influence water requirements, including stage of development, pace of metabolism and breathing, physical activity, body and environment temperature, moisture in the atmosphere, workload of the kidneys and dietary pattern.
Malaysia	Drink plenty of water daily.	Water is the principal chemical constituent of the human body. It absorbs metabolic heat within the body, maintains vascular volume and serves as the medium for transport within the body by supplying nutrients and removing waste. Daily water intake must be balanced with losses in order to maintain total body water. Body water deficits challenge the ability of the body to maintain homeostasis during perturbations and can affect function and health. Environmental factors (physical activity and heat strain, altitude and cold) and dietary factors (caffeine, alcohol, sodium intake) are the factors that affect water requirement.
Philippines	No specific message, but the message on "eating a variety of foods everyday" mentions importance of water in the daily diet.	The human body is composed of 60-70% water. Water helps maintain body temperature at 37 degrees Celsius, transports electrolytes and other nutrients, excretes waste products from the lungs, skin and kidneys, lubricates joints, and cushions the nervous system. Water is the most essential of all the nutrients in the sense that the absence of water causes death more quickly than the absence of any other nutrient.

Topic 6. Water — Continued

Country	Key Message	Rationale
Singapore	No specific message, but the message on 'enjoy a variety of foods using the Healthy Diet Pyramid as a guide' provides brief information on water and recommends six to eight glasses of fluid (1.5–2.0 litres) to be included in the diet every day.	
Thailand	No specific message	Not applicable.
Vietnam	Drink adequate boiled water every day.	Water is the basic element of survival. Our body needs around 2500 ml of water every day, 1000 – 1500ml of which can be met by drinking water.

Topic 7. Salt

Country	Key Message	Rationale
Indonesia	Limit intake of foods high in sugar, salt and fat (<i>Batasi konsumsi pangan manis, asin dan berlemak</i>). (Note: The FBDDG has combined the three components in one message; but for this tabulation, the three components are separately discussed to facilitate comparison with other countries).	Excessive salt intake will adversely affect body health especially in raising blood pressure. Consume iodised salt. Potassium salt can be used as well because consuming more foods with potassium can help to reduce blood pressure. Foods that are high in potassium include potatoes, raisins, banana, beans and yoghurt.
Malaysia	Choose and prepare foods with less salt and sauces.	The prevalence of high blood pressure has increased in the country in the past decade and it is a major risk factor for cardiovascular disease and premature death. Dietary salt has been associated with high blood pressure and its related co-morbidity. Therefore, reducing the average salt intake of the population is likely to decrease the health burden associated with high blood pressure and improve public health.
Philippines	Salt intake is featured in 2 key messages. The first is combined with intake of fatty and sugar-rich foods; the second is in relation to iodine deficiency disorders: Limit intake of salty, fried, fatty and sugar-rich foods to prevent cardiovascular diseases (Note: The FBDDG has combined the three components in one	Sodium is an essential mineral for normal body functions. Nerve transmission and muscle function require sodium. Sodium also helps control the body's acidity and aids in the absorption of some nutrients, such as glucose. Sodium together with potassium, acts to maintain proper body water distribution and blood pressure. However, too much salt or excessive sodium intake will elevate blood pressure resulting in hypertension, which in turn increases the risk of heart disease, stroke and other diseases. The 8th National Nutrition Survey has shown a 22.3% prevalence of hypertension among adults. It is estimated that Filipinos eat more salt and sodium than required.

Topic 7. Salt — Continued	Key Message	Rationale
Country	<p>message; but for this tabulation, the three components are separately discussed to facilitate comparison with other countries). Use iodised salt to prevent Iodine Deficiency Disorders.</p>	<p>National nutrition surveys of the Food and Nutrition Research Institute have consistently shown high prevalences of Iodine Deficiency Disorders (IDD). IDD, caused by deficiency of iodine in the diet, is a wide range of disorders. Scientific evidence shows alarming effects of IDD and is the single greatest cause of preventable mental retardation. Severe deficiencies cause cretinism, stillbirth and miscarriage or reproductive failures among women desiring pregnancy. Mild deficiency can significantly affect learning abilities. The regular use of iodised salt in the table and in cooking, in addition to taking iodine-rich foods, will greatly help in eradicating this preventable disease.</p>
Singapore	<p>Choose and prepare food with less salt and sauces.</p>	<p>Salt contains 40% sodium, a mineral that affects blood pressure. Excessive sodium intake results in fluid retention in the body, causing blood volume to expand. This exerts pressure on the wall of blood vessels, raising blood pressure. High blood pressure is a major risk factor for stroke and kidney disease. Excessive consumption of salt-preserved, cured or smoked food has also been associated with a higher risk of stomach and nasopharyngeal cancers. The higher risk has been attributed to salt and sodium nitrites commonly used as preservatives in these products. The main sources of sodium in the diet of Singaporeans are salt and sauces added during cooking. Salt is only one of the sources of sodium in the diet. Other sources include sauces, monosodium glutamate (MSG), preservatives and salt substitutes.</p>
Thailand	<p>Avoid sweet and salty foods (<i>Note</i>: The FBDG has combined the two components in one message; but for this tabulation, the two components are separately discussed to facilitate comparison with other countries).</p>	<p>The salty taste of Thai foods often comes from salt and salt containing additives, e.g. fish sauce, soybean sauce, black soybean sauce and soybean paste. They are also used as preservatives in fermented foods. Sodium salt is also found in other foods like bakery products, snack foods and monosodium glutamate. Excessive salt intake places a person at risk of hypertension and also more prone to stomach cancer. A diet containing overly salty foods is therefore not beneficial to health.</p>
Vietnam	<p>Do not use too much salt. Iodised salt is recommended.</p>	<p>Our body needs sodium and the recommended salt intake is around 6 grams per day. Vietnamese nowadays consume more salt than they need. Intake of salt and salty foods should be limited because of the adverse health effects it brings following excessive intake. Iodised salt utilisation is recommended to prevent iodine deficiency disorders.</p>

Topic 8. Fats & oil

Country	Key Message	Rationale
Indonesia	<p>Limit intake of foods high in sugar, salt and fat. (<i>Batasi konsumsi pangan manis, asin dan berlemak</i>). (Note: The FBDDG has combined the three components in one message; but for this tabulation, the three components are separately discussed to facilitate comparison with other countries).</p>	<p>Excessive fat and oil intake will lead to decreased consumption of other food. This is because fat remains for a longer time in the digestive system, compared to protein and carbohydrate and therefore can give rise to a feeling of being full for a longer time. Blood cholesterol level that is higher than normal can cause heart disease. This can be prevented through practising low fat consumption.</p>
Malaysia	<p>Limit intake of foods high in fats and minimise fats and oils in food preparation.</p>	<p>The regular consumption of a high fat diet will result in excessive energy intake and contribute to obesity. An unhealthy diet, high in saturated fat and cholesterol, is a major contributing factor to ischaemic heart disease and cerebrovascular diseases, the top causes of mortality in Malaysia for many years. Malaysians would benefit from a diet low in total fat, saturated fat and cholesterol. A moderate fat consumption of less than 30% of total daily energy intake is recommended.</p>
Philippines	<p>Limit intake of salty, fried, fatty and sugar-rich foods to prevent cardiovascular disease (Note: The FBDDG has combined the three components in one message; but for this tabulation, the three components are separately discussed to facilitate comparison with other countries).</p>	<p>In the Philippines, dyslipidemia, a condition characterised by high levels of low density cholesterol (LDL) or “bad cholesterol”, low levels of high density cholesterol (HDL) or “good cholesterol” and an increase in total cholesterol and triglyceride levels is prevalent among 20-year olds and older adults. While fat enhances flavour of meals, and facilitates the absorption and utilisation of fat-soluble vitamins A, D, E and K and other minerals, intake of fried and fatty foods should be limited. Excessive intake of fats should be avoided as this may lead to obesity, a risk factor in the development of many chronic diseased conditions.</p>

Topic 8. Fats & oil — Continued

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Singapore	Choose and prepare food with less fat, especially saturated fat.	Dietary fat provides energy, contains essential fatty acids and acts as a carrier for fat-soluble vitamins A, D, E and K. We need some fat in the food we eat. However, fat is also a concentrated source of energy. A diet high in fat can provide excess calories and lead to overweight and obesity. A diet high in saturated fat and low in unsaturated fats increases the risk of coronary heart disease and stroke. Restrict fat intake to 25-30% of total energy intake
Thailand	Eat a diet containing appropriate amounts of fat.	Thai people are consuming more fat today than they did in the past, and there is a growing tendency to consume even more fat as time passes. People are thus likely to gain weight, become obese and place themselves at risk of degenerative diseases. One strong recommendation is to limit energy from fat to not more than 30% of total energy intake per day. Consuming too much saturated fat and cholesterol will increase cholesterol levels in blood leading to a greater risk of cardiovascular disease. To prevent this, saturated fat and cholesterol should be limited. The cooking process plays an integral role in adding more fat to foods, especially in the case of deep-frying or stir-frying. It is advisable to cook foods by boiling, steaming or grilling which yield less fat. Foods with coconut milk are also considered high-fat foods. Neither an excessive fat intake nor absolute avoidance is suggested.
Vietnam	Eat appropriate amount of fats/oils in a good combination. Sesame and peanut are recommended.	Fats/oils are sources of energy and fat soluble vitamin (A, D, E and K). Fats/oils play many functional roles in the human body. We should eat a combination of fats and vegetable oils, with 10% of total energy provided by saturated fats and 10-15% by unsaturated fats.

Topic 9. Sugar

Country	Key Message	Rationale
Indonesia	<p>Limit intake of foods high in sugar, salt and fat. (<i>Batasi konsumsi pangan manis, asin dan berlemak</i>).</p> <p>(<i>Note: The FBDCG has combined the three components in one message; but for this tabulation, the three components are separately discussed to facilitate comparison with other countries</i>).</p> <p>Consume foods and beverages low in sugar.</p>	<p>Excessive sugar intake will lead to weight gain, and if continued for a long time, may increase blood sugar levels and increase the risk to occurrence of type 2 diabetes and indirectly contribute to diseases such as osteoporosis, cardiovascular diseases and cancer.</p>
Malaysia	<p>Consume foods and beverages low in sugar.</p>	<p>Sugar is the main cause of dental caries and a lower absolute sugar intake would result in an appreciable decrease in caries incidence. Sugar could contribute to obesity, either by contributing towards excess energy or by accentuating appetite leading to over-consumption. Sugar intake in excess of recommendations could displace micronutrient-dense food from diet, resulting in a greater risk of vitamin and mineral deficiency.</p>
Philippines	<p>Limit intake of salty, fried, fatty and sugar-rich foods to prevent cardiovascular disease.</p> <p>(<i>Note: The FBDCG has combined the three components in one message, but for this tabulation, the three components are separately discussed to facilitate comparison with other countries</i>).</p>	<p>Sugars are building blocks of carbohydrates and have multiple functions within the body. They are used as primary sources of energy, providing 20 calories per teaspoon. Sugar enhances the taste, texture, colour and aroma of many kinds of foods. The main types of sugar are sucrose, lactose and fructose. However, excessive intake of sugars is to be avoided as there are various health concerns associated with this. Certain foods and beverages with added sugar might replace more nutrient-dense foods, along with the vitamins and minerals they provide. Diets high in sugar may lead increased risk of cardiovascular diseases (CVD).</p>

Topic 9. Sugar – Continued

Country	Key Message	Rationale
Singapore	Choose beverages and foods with less sugar.	Frequently eating or drinking sweet food and drinks between meals can promote dental caries, especially if oral hygiene is neglected. Added sugar in beverages and food provide empty calories – calories with little nutritional value. Excessive consumption of beverages and food high in added sugars can contribute considerably to energy intake and lower consumption of more nutritious beverages and food. Energy intake if exceeding daily energy requirement and not expended through physical activity can lead to weight gain and obesity. Obesity is a risk factor for diabetes, coronary heart disease, stroke and high blood pressure.
Thailand	Avoid sweet and salty foods. (<i>Note:</i> The FBDSG has combined the two components in one message; but for this tabulation, the two components are separately discussed to facilitate comparison with other countries).	Most foods that are eaten on a daily basis, either as a main dish or dessert, contain sugar. Additional sugar is also taken in from soft drinks, candy, toffee, jelly, syrup and sugar added to tea, coffee and other beverages. Therefore excessive amounts of energy are added to our regular diet. Children who eat sugary foods often have a lower appetite and are prone to tooth decay. Sugary foods should thus be limited in their diets.
Vietnam	Increase physical activities, maintain appropriate weight, abstain from smoking, and limit the consumption of alcoholic /soft drinks and sweets. (<i>Note:</i> Five messages combined, i.e., physical activity, body weight, smoking, alcohol and sugar).	The consumption of alcoholic/sweet drinks should be restricted.

Topic 10. Healthy body weight

Country	Key Message	Rationale
Indonesia	Do adequate physical activities and maintain normal body weight. (<i>Lakukan aktivitas fisik yang cukup dan pertahankan berat badan normal</i>). (Note: The FB DG has combined the two messages - body weight and physical activity; but for this tabulation, the two components are separated to facilitate comparison with other countries).	Maintaining a normal weight allows one to prevent various non-communicable diseases. The simple basis to be followed is to maintain a normal weight and balance the calories consumed with the calories used (burnt). A healthy food consumption pattern along with physical activity in a pollution-free environment will help control body weight and enable the body to become healthier.
Malaysia	Maintain body weight in a healthy range.	Excessive body fat leads to a much higher risk of premature deaths and many serious chronic diseases such as type 2 diabetes, heart disease, hypertension and certain types of cancers. Obesity drastically reduces quality of life, incurs high health care cost and poses numerous psychological problems. On the other hand, a low body weight is also unhealthy because it increases the risk of other health conditions e.g., anaemia and low bone mass as well as distortion of body image.
Philippines	Attain normal body weight through proper diet and moderate physical activity to maintain good health and help prevent obesity.	The country is facing a double burden of malnutrition. In the 2013 National Nutrition Survey, children, elderly and pregnant women were shown to be generally underweight. On the other hand, overweight and obesity was highly prevalent among adults and has been increasing at an alarming rate. Even among children, the prevalence of overweight and obesity, while still low, has also been increasing in the last few years. This increasing prevalence of overweight and obesity is a result of improper diet and physical inactivity in an environment conducive to obesity. These problems impose increased risk to one's well-being. In fact, obesity is a major risk factor for non-communicable diseases such as cardiovascular disease, diabetes, hypertension and even some forms of cancer. Attainment of normal body weight is therefore vital for sustaining a healthy life.

Topic 10. Healthy body weight — Continued

Country	Key Message	Rationale
Singapore	Achieve and maintain body weight within the normal range.	Our body uses energy derived from food for all activities. To maintain body weight, energy intake from food must balance with the energy used in physical activities. When more energy is consumed than used, weight gain occurs. Weight gain is usually accompanied by an increase in body fat. Maintaining a normal weight and body fat level reduces the risk of chronic diseases such as high blood pressure, heart disease, stroke, diabetes, certain cancers, arthritis and breathing problems. A Body Mass Index (BMI) below the normal range does not usually present a health risk unless there is associated illness. However, there may be health problems associated with BMI below the normal range, including irregular menstruation in females, infertility and osteoporosis.
Thailand	Eat a variety of foods from each of the 5 good groups and maintain proper weight. (<i>Note:</i> this message has two components; the first component on eating a variety of foods has been dealt with under that specific topic).	Body weight is an important indicator of each person's health status. Each individual should maintain a proper weight for age and height, and it is necessary that we maintain our proper weight by eating good food along with regular and appropriate exercise. In general, underweight persons tend to be weak, fall sick easily, and cannot perform efficiently while working or studying. In contrast, overweight persons are at risk of coronary heart disease, diabetes mellitus, hypertension and certain types of cancer. To maintain a proper body weight, appropriate exercise should be carried out regularly, at least 3 to 5 times per week. Exercise can help to strengthen the body and heart muscles as well as improve blood circulation.
Vietnam	Increase physical activities, maintain appropriate weight, abstain from smoking, and limit the consumption of alcoholic/soft drinks and sweets. (<i>Note:</i> five messages combined, i.e., physical activity, body weight, smoking, alcohol and sugar).	Body weight should be regularly monitored and maintained at a level appropriate to height.

Topic 11. Physical activity

Country	Key Message	Rationale
Indonesia	Do adequate physical activities and maintain normal body weight (<i>Lakukan aktivitas fisik yang cukup dan pertahankan berat badan normal</i>). (Note: The FBBDG has combined the two messages - body weight and physical activity; but for this tabulation, the two components are separated to facilitate comparison with other countries).	Regular physical activity will increase the chance of a longer and healthier life. Various groups of the population (from children to elderly, as well as individuals with physical disabilities, pregnant and lactating women) can benefit from physical activities so as to (1) prevent premature death; (2) prevent non-communicable diseases (such as coronary heart disease, stroke, cancer, type 2 diabetes, osteoporosis and depression); (3) reduce the risk of high blood pressure and high blood cholesterol; (4) improve physical fitness and muscular strength; (5) improve functional capacity; (6) optimise mental health and cognitive function; and (7) prevent trauma and sudden heart attack.
Malaysia	Be physically active everyday.	Physical activity is important for the health and well-being of people of all ages. It is an important factor in enhancing health and reducing the risk of various chronic diseases. Regular physical activity also appears to promote a sense of well-being, helps in releasing tension, and decreases the likelihood of anxiety.
Philippines	Be physically active, make healthy food choices, manage stress, avoid alcoholic beverages and do not smoke to help prevent lifestyle-related non-communicable diseases. (Note: this message includes physical activity, diet choices, alcohol consumption and smoking; the focus in this message is only on physical activity).	In the Philippines, the National Nutrition Survey (2013) reported that 37.0% and 52.9% of males and females, respectively were insufficiently physically active or failed to engage in moderate- or vigorous-intensity physical activities. Regular exercise burns off energy thereby assisting weight control or its reduction. It also helps improve blood circulation, muscle tone and the efficiency of heart and lungs. It also helps one to relax, cope with stress, and promotes sound sleep. The long-term benefits of a physically active lifestyle is that it reduces the risk of heart disease, diabetes and high blood pressure.

Topic 11. Physical activity — Continued

Country	Key Message	Rationale
Singapore	No specific message but there is a brief discussion on health benefits of regular physical activity and tips on physical activity is included in the message on “achieve and maintain body weight within the normal range.”	Not applicable
Thailand	No specific message but importance of exercise is highlighted under the message on importance of maintaining proper weight.	Not applicable
Vietnam	Increase physical activities, maintain appropriate weight, abstain from smoking, and limit the consumption of alcoholic/soft drinks and sweets. (<i>Note:</i> five messages combined, i.e. physical activity, body weight, smoking, alcohol and sugar).	Regular physical exercise and living an active lifestyle should be seen as a need and become a practice for everyone.

Topic 12. Breakfast

Country	Key Message	Rationale
Indonesia	Eat breakfast regularly. (<i>Biasakan sarapan</i>)	Breakfast refers to eating and drinking activities that are conducted between waking up in the morning until 9am to meet part (15-30%) of the daily nutritional needs in order to be healthy, active and productive. Many Indonesians still do not have the habit of consuming breakfast. Not having breakfast would adversely affect the learning process in schools for school children, reduce their physical activity, cause obesity among adolescents and adults, and increase the risk of unhealthy snacking. On the other hand, breakfast provides the body with the nutrients needed for thinking, working, and optimal physical activity after waking up in the morning. For school children, adequate breakfast has proven to improve concentration and stamina to study. For teens and adults, adequate breakfast helps to prevent obesity. Being accustomed to breakfast is also about getting up early in the morning, being active, and preventing over-eating during morning snack or lunch.
Malaysia	No specific message	Not applicable
Philippines	No specific message	Not applicable
Singapore	No specific message	Not applicable
Thailand	No specific message	Not applicable
Vietnam	No specific message	Not applicable

Topic 13. Breastfeeding

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Indonesia	No specific message. In the section on Balanced Nutrition for Specific Groups in Chapter II on Principles of Balanced Nutrition, importance of exclusive breast feeding is emphasised.	Not applicable
Malaysia	Practise exclusive breastfeeding from birth until six months and continue to breastfeed until two years of age.	Breastfeeding brings clear short term benefits for child health by reducing mortality and morbidity from infectious disease. Exclusive breastfeeding also decreases rates of sudden infant death syndrome in the first year of life, lymphoma, leukemia, Hodgkin disease and asthma. Breastfeeding is also associated with long term benefits beyond infancy. This includes strengthening immune status, increased cognitive development in childhood and positive association with health status in adulthood. Important benefits have also been described for mothers, which include more likely to return to pre-pregnancy weight as well as reduced risk to various health problems.
Philippines	Breastfeed infants exclusively from birth up to 6 months then give appropriate complementary foods while continuing breastfeeding for 2 years and beyond for optimum growth and development.	Breastfeeding is the normal way of providing young infants with optimum nutrition needs for healthy growth and development. Practically, all mothers can breastfeed, provided they have accurate information, and the support of their family, the community, the health care system and society. Breastfeeding should be initiated within the first hour after delivery. The World Health Organization or WHO recommends exclusive breastfeeding of the baby's first 6 months of life, and continued breastfeeding with the addition of appropriate adequate and safe complementary foods up to two years old and beyond. The benefits of exclusive breastfeeding on child survival, growth and development are well documented. Exclusive breastfeeding also provides health benefits for mothers.
Singapore	No specific message	Not applicable
Thailand	No specific message	Not applicable
Vietnam	Initiate breastfeeding right after birth, exclusively breastfeed in the first 6 months, then start proper complementary feeding and continue breastfeeding to 24 months.	Mother's milk is the best food that can provide adequate nutrients to meet the infant's growth requirements. Mothers are encouraged to initiate early breastfeeding, to exclusively breastfeed in the first 6 months and to start proper complementary feeding from 6 months (180 days old).

Topic 14. Food safety

<i>Country</i>	<i>Key Message</i>	<i>Rationale</i>
Indonesia	No specific message. However in the 2nd of the four pillars of balanced nutrition which focuses on practising personal cleanliness and topic 17 on personal hygiene the importance of prevention against food poisoning is also emphasised.	Not applicable
Malaysia	Consume safe and clean foods and beverages.	Food borne diseases result from the consumption of food and beverage contaminated by a food borne hazard, which may be a biological, chemical or physical agent. Food borne diseases cause serious morbidity and mortality consequences and significant economic losses. Proper food choice, preparation, storage and cooking can prevent most food-borne illness.
Philippines	Consume safe foods and water to prevent diarrhoea and other food and water-borne diseases.	Food and water are essential to life. We need to be sure that the food and water we consume provide the intended benefits we need and not cause harm or illness. Diarrhoea is a major cause of malnutrition in infants and young children. A great proportion of diarrheal disease can be attributed to contamination of food and drinking water. A healthy attitude towards cleanliness and sanitation would prepare every individual to practice food safety. Food safety in the home is a shared community effort of environmental hygiene and sanitation. It should be known that food, to be considered safe, should be carefully handled from its raw form until the time it is consumed. Adequate education followed by responsive action is most important in preventing any illness from unclean and contaminated food.
Singapore	No specific message.	Not applicable
Thailand	Eat clean and uncontaminated food.	Eating contaminated or unclean food can lead to food poisoning and other gastrointestinal diseases. There are several sources of contamination such as bacteria, parasites and chemicals especially heavy metals in the process of food production, preparation, cooking and unhygienic handling. Also potentially harmful are foods prepared and sold by street vendors and those foods containing non-permitted additives and preservatives. To be in good health, one should know how to select, prepare and cook foods in a hygienic manner so as to retain their nutritional value as much as possible.
Vietnam	Ensure food safety rules in food selection, processing and preservation.	Unsafe food can affect human health and nutritional status. Each family and consumer should practise proper food selection, preparation and good hygiene. The World Health Organization's 5 keys to safer food which incorporates all the message of the 10 Golden Rules for Safe Food should be followed.

Topic 15. Food and nutrition labels

Country	Key Message	Rationale
Indonesia	Read the food labels of packaged foods. (<i>Biasakan membaca label pada kemasan pangan</i>).	The label is a description of the content, types, and composition of nutrients, expiry date and other important information of the food on the packaging. The detailed information on packaged food labels is helpful for the consumer to know the ingredients contained in the food. Moreover, it can help to estimate the hazard that it might pose to consumers who have a high risk for certain diseases. It is therefore advisable to read the label of the packaged food, especially information about the nutrient content and the expiry date before buying or eating the food.
Malaysia	Make effective use of nutrition information on food labels.	Nutrition information on a food label is a particularly important source of information for consumers about the food they intend to purchase. Such information, which includes nutrition labelling and nutrition and health claims, can assist consumers in making better food choices when planning daily meals. Nutrition information on food labels has been recognised as one of the strategies to assist consumers adopt healthy dietary practices. It is however important for consumers to understand and effectively utilise the two main components of nutrition information
Philippines	No specific message	Not applicable
Singapore	No specific message	Not applicable
Thailand	No specific message	Not applicable
Vietnam	No specific message	Not applicable

Topic 16. Alcohol		Rationale
Country	Key Message	
Indonesia	No specific message	Not applicable
Malaysia	No specific message	Not applicable
Philippines	Be physically active, make healthy food choices, manage stress, avoid alcoholic beverages and do not smoke to help prevent lifestyle-related non-communicable diseases. (<i>Note:</i> this message includes physical activity, diet choices, alcohol consumption and smoking; the focus in this message is only on alcohol consumption).	The harmful use of alcohol is considered a global problem which dangerously affects both individual and social development. Alcohol abuse causes immediate harm far beyond the physical and psychological health of the drinker. Excessive consumption of alcoholic beverages may lead to weight gain resulting in obesity, nutrient deficiencies, increased triglycerides, hypertension, erratic blood glucose control and other serious illnesses such as cirrhosis of the liver, cardiovascular diseases and certain types of cancer. Harmful drinking is also a major factor for neurological and psychiatric disorders, such as alcohol use disorders and epilepsy; Wernicke-Korsakoff syndrome, a thiamine deficiency in alcohol abusers; and foetal alcohol syndrome, a neural defect caused by maternal alcohol consumption. Pregnant women should abstain from consuming alcoholic beverages because alcohol may cause pregnancy problems like spontaneous abortion, foetal alcohol syndrome, impaired foetal development, possible malformations and other birth problems of the foetus.
Singapore	If you drink alcoholic beverages, do so in moderation.	Alcoholic beverages are harmful when consumed in excess. Excessive alcohol intake can lead to dependency and a number of other serious health problems. Excessive alcohol consumption alters an individual's judgement and this may cause motor and industrial accidents, violence, suicide, social and psychological problems. Excessive consumption of alcoholic beverages raises the risks of developing hypertension, stroke, alcoholic cardiomyopathy, liver cirrhosis and other liver disorders, brain damage, pancreatitis and certain cancers (and breast cancer for women). Chronic heavy drinking increases the risk of developing several types of cancers. Alcohol provides 'empty calories' (calories with no nutritional value). Therefore, heavy drinkers are also at risk of malnutrition as they may substitute nutritious food with alcoholic beverages. Due to the harmful health and social consequences of alcohol consumption, adults who do not drink alcoholic beverages should not be encouraged to start drinking despite evidence of potential benefits for heart health.

Topic 16. Alcohol — Continued

Country	Key Message	Rationale
Thailand	Avoid or reduce consumption of alcoholic beverages.	Regular consumption of alcoholic beverages is harmful to health and can lead to a substantial loss of life and property. Regular intake of alcoholic drinks can damage liver cells and increase the risk of peptic, duodenal and esophageal cancer. Those who drink only alcohol and take no food are at risk of nutritional deficiencies. Those who drink and consume food rich in protein and fat are likely to become obese and are at risk of developing other related diseases. Alcohol affects the central nervous system (CNS) and depresses the brain centres that control the heart and consciousness. It leads to impaired judgment, a disturbed sense of balance and decreased work capacity. Finally, money is spent unwisely when purchasing alcoholic drinks.
Vietnam	Increase physical activities, maintain appropriate weight, abstain from smoking, and limit the consumption of alcoholic/ soft drinks and sweets. (<i>Note:</i> five messages combined, i.e., physical activity, body weight, smoking, alcohol and sugar).	The consumption of alcoholic/sweet drinks should be restricted.

Topic 17. Personal hygiene

Country	Key Message	Rationale
Indonesia	Wash hands with soap and clean running water. (<i>Cuci tangan pakai sabun dengan air bersih mengalir</i>).	The importance of proper washing of hands using soap and clean running water is to maintain overall cleanliness and to prevent germ/bacteria from spreading from the hands to the food that is to be consumed and to prevent our body from being exposed to the bacteria. Hygienic behaviour should be practised by every member of the family to avoid the disease because 45 % of diarrheal disease can be prevented by washing hands. October 15 has been recognised as the Global Handwashing Day with Soap initiated by the United Nations as one way to reduce mortality among children less than five years of age as well as to prevent the spread of disease. The use of special hand washing soap either in the form of bars or liquids is highly recommended to ensure maximal cleanliness of the hand.
Malaysia	No specific message	Not applicable
Philippines	No specific message	Not applicable
Singapore	No specific message	Not applicable
Thailand	No specific message	Not applicable
Vietnam	No specific message	Not applicable

Food-Based Dietary Guidelines of Southeast Asian Countries: Part 2 - Analysis of Pictorial Food Guides

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ABSTRACT

Introduction: Part 2 of the manuscript compares the the main pictorial food guides and food plates of the officially published food-based dietary guidelines (FBDGs) of six countries of the Southeast Asian region. **Methods:** The main pictorial food guides in each of the six FBDGs, together with available explanatory notes, were extracted and analysed in terms of various attributes such as their shapes and graphics, food groupings and their contents and recommended amounts. In addition, food plates, if available in the countries surveyed, were also analysed. **Results & Discussion:** All the six countries surveyed adopted different pictorial food guides. Indonesia uses a culinary icon, a cone-shaped rice dish, while Thailand uses an inverted food pyramid. The food pyramid is used in the other four countries, namely Malaysia, Philippines, Singapore and Vietnam. While differing in their visual presentations and several minor details, the six pictorial food guides are similar in their essential attributes. Indonesia, Philippines and Singapore have introduced the food plate as additional visual guides. Although there are several differences in the way these three food plates are presented, they are based on the same basic concept of imparting the message of balance and proportionality among the major food groups. Additional related images or messages provided include drinking enough water, personal hygiene and increasing physical activity. **Conclusion:** The pictorial food guides and food plates of the countries surveyed all aimed to serve as simple nutrition education tools in encouraging the population to adopt healthy diets. They are all based on the principles of variety, proportionality and balance.

Key words: Food-based dietary guidelines, food plates, food pyramids, pictorial food guides, public health nutrition, Southeast Asia

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INTRODUCTION

Food-based dietary guidelines (FBDGs) are a set of advisory statements that provide dietary advice for the population for the purpose of promoting health and preventing nutrition-related deficiencies and excesses. FBDGs may also include advice on other food and health related issues, such as food safety, physical activity, and healthy lifestyle. With the objective of comparing the FBDGs of countries in the region, the Southeast Asia Public Health Nutrition (SEA-PHN) Network¹ undertook a project to compile and analyse the official dietary guidelines of countries in Southeast Asia. The key messages and scientific rationale of six FBDGs in the region are published in Part 1 of this Supplement (Tee *et al.*, 2016).

All the FBDGs of the countries analysed also included pictorial food guides to further assist the public in understanding and following the dietary messages. Such food guides are visual representations that graphically translate the FBDGs into a single illustration, addressing the recommended pattern of the total diet that embodies the over-all message in the FBDGs. Generally, food guides show individual food groups divided according to their nutritional values. Each group usually depicts illustrative foods that are commonly consumed in the customary diet. By varying the size of the different food groupings, food guides illustrate at least three important messages that constitute a healthy diet, namely, variety, proportionality and balance. The message of variety is depicted by including all food groups that constitute a normal diet; the messages of proportionality and

balance are shown by the different sizes of the food groupings designed to supply proper proportions of foods and to obtain adequate foods and nutrients in a proper balance. Being graphic illustrations, food guides primarily serve as a tool for nutrition education and behaviour change, at the same time as symbols in a country's nutrition education and communication strategy (FAO, 2015)

Part 2 of this Supplement compares the pictorial food guides in the six FBDGs compiled from the Southeast Asian countries. These visual guides will be analysed in terms of various attributes such as their shape and graphics, food groupings and their contents and recommended amounts, as well as any other associated messages. The commonalities and differences among the different pictorial guides will be identified. This analysis will enable us to draw important lessons from the various factors and considerations that went into their formulation. This compilation of the pictorial food guides in the region can serve as a reference for other countries that intend to develop or revise their own pictorial guides based on their respective national FBDGs.

METHODS

The method of obtaining the official FBDGs of Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam for the purpose of this project has been described in Part 1 of this Supplement (Tee *et al.*, 2016). The main pictorial food guides in each of these FBDGs, namely food pyramids and similar guides, together with available explanatory notes, were extracted and analysed for this part of the publication.

¹ The Southeast Asia Public Health Nutrition (SEA-PHN) Network is a partnership of key stakeholders in the region, namely nutrition societies/associations and corporate companies, dedicated to promoting public health nutrition among the population and alleviating nutrition problems in the region (<http://sea-phn.org>). Authors are founding members of the SEA-PHN Network Council.

To aid in the comparison and analysis, a matrix of the major attributes and key messages of the food guides was prepared. Basically, the food guides were compared according to their food categorisation and quantitative recommendations. In particular, comparison and analysis were made on their shape and number of levels, the food groups and illustrative foods in each group, the relative sizes of the food groups, and the recommended amounts of each of the food groups, as well as other health related messages.

In addition, food plates, if available in the countries surveyed, were also compiled and analysed. The plates were analysed in the way they are apportioned for the different major food groups as well as other accompanying images or messages.

RESULTS

Features of the main country pictorial food guides

All the six countries in the survey adopted different visual presentations for their pictorial food guides. The main pictorial guides include pyramids, *tumpeng* (a cone-shaped structure), and flag (inverted pyramid) (Appendix 3, Figures 1-6). An analysis of the make-up of each visual guide, e.g., the levels of the pyramid or *tumpeng* or flag, and the accompanying serving sizes or messages, if any, are provided in Table 1. In addition, three countries, namely Indonesia, Philippines and Singapore, introduced a food plate as an additional guide to the consumer (Appendix 4, Figures 7-9). An analysis of the plates and related messages are provided in Table 2.

Indonesia uses a cone-shaped *tumpeng* (locally called *Tumpeng Gizi Seimbang* (TGS)) in advising the population on balanced diet and healthy eating (MOH Indonesia, 2014). The *Tumpeng* is a cone-shaped rice dish, traditionally featured in the *slamatan* ceremony and has been recognised as a culinary icon (Appendix 3, Figure 1). The *Tumpeng Gizi Seimbang*

consists of four layers, with the layers becoming smaller from bottom to top. The largest layer at the bottom depicts cereals and root crops; the second, divided into a slightly larger area shows vegetables and a slightly smaller area shows fruits; the third layer shows commonly consumed animal foods and beans; and the smallest topmost layer in the form of a cone illustrates fats and oils, sugar and salt. An illustration of a glass of water is included next to the *tumpeng*. The cone is placed in a large tray as its base, decorated with symbols of washing hand, various exercises and a person with a weighing scale. With these decorations, the TGS intends to convey the four principles of healthy life style: variety of food to meet individual requirement, cleanness and food safety, regular activity and sport, and ideal weight monitoring (Soekirman, 2011).

Malaysia uses the three-dimensional Malaysian Food Pyramid 2010 with four levels (Appendix 3, Figure 2) as a visual tool in guiding the population in designing a healthy diet (NCCFN Malaysia, 2010). It is intended as a guide to provide a framework for the types and amounts of food that should be eaten in combination to provide a healthy diet. Each level represents different food groups (from bottom to top: rice, noodle, bread, cereals, cereal products and tubers group; vegetables and fruits group; milk and milk products, fish, poultry, meat and legumes group; fat, oil, sugar and salt group) with the size and area of each food group becoming smaller from bottom to top, indicating that one should eat more of the foods at the base whereas the foods at the top of the pyramid should be consumed less. Recommended number of servings per day for each food group is indicated beside each food group.

Daily Nutritional Guide (DNG) Pyramid is used as a nutritional pictorial guide for Filipinos (Appendix 3, Figure 3) (FNRI Philippines, 2008). The Philippines has developed individual pyramids for

Table 1. Pictorial food guides and related key messages used in FBDCGs of six Southeast Asian countries

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Name of pictorial guide	<i>Tumpeng Gizi Seimbang</i> (Figure 1*)	Malaysian Food Pyramid 2010 (Figure 2*)	Daily Nutritional Guide Pyramid for Filipino Adults (Figure 3*)	Singapore's Healthy Diet Pyramid 2009 (Figure 4*)	Nutrition Flag Healthy Eating for Thais (Figure 5*)	Vietnam Food Guide Pyramid (Figure 6*)
Format	<i>Tumpeng</i> , (cone-shaped)	Pyramid	Individual pyramid based on different age groups	Pyramid	Flag, inverted pyramid shape	Pyramid
No. of levels	5	4	6	4	4	7
Cereals & products, tubers	3-4 portions/ day	Eat adequately, 4-8 servings/ day	5-8 servings/ day	Select more, 5-7 servings/ day (2-3 servings should be whole-grain products)	8-12 rice-serving spoons	Eat adequately, 12kg of staple food/ month
Vegetables	3-4 portions/ day	Eat plenty, 3 servings/ day	3 servings/ day	Select more, 2 servings/ day	4-6 rice-serving spoons	Eat more, 10kg of vegetables/ month
Fruits	2-3 portions/ day	Eat plenty, 2 servings/ day	2-3 servings/ day	Select more, 2 servings/ day	3-5 portions	Eat adequately, as much as possible / month
Milk & milk products	NA	Eat in moderation, 1-3 servings/ day	1 glass/ day	3 servings/ day (1/2 serving should come from dairy or other high calcium products)	1-2 glasses	NA
Fish, poultry, meat, eggs, legumes	2-4 portions/ day	Eat in moderation, 1/2-2 servings of poultry, meat, egg/ day; 1 serving of fish/ day; 1/2-1 serving of legumes/ day	Fish, shellfish, meat & poultry, dried beans & nuts 3-4 servings/ day; egg 1 piece/ day	NA	6-12 tablespoons	Eat moderately, 2.5kg of fish/aqua products/ month; 1.5kg of meat/ month; 2kg of tofu/ month

Continued next page

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Fat, oil, sugar, salt	Limit sugar intake - 4 tablespoons/ day; Salt - 1 tablespoon/ day Oil - 5 tablespoons /day	Eat less; no quantitative recommendation	Sugar/sweets 5-8 tpsps/day; Fats & oils 6-8 tpsps/day	Select less, use in small amounts; no quantitative recommendation	Eat only in limited amounts	Eat fat moderately, 600g of fats, oils sesame, peanuts/ month; eat less sugar, 500g of sugar/month; limit salt intake, less than 180g of salt/month
Water	8 glasses of plain water/day	NA	8 glasses/day	NA	NA	NA
Physical activity	Play football, walk, exercise, do housework, integrated exercise	- Be active everyday in as many ways as you can - Accumulate at least 30 min/ day of moderate intensity physical activity on at least 5-6 days a week, preferably daily - Participate in activities that increase flexibility, strength and endurance of the muscle as many as 2-3 times a week - Limit physical inactivity & sedentary habits	Do regular exercise in most days of the week for at least 30 min	NA	NA	NA
Personal hygiene	Practise hand washing	NA	Practise good personal and environmental hygiene	NA	NA	NA

* Figures 1-6 are in Appendix 3

NA = not mentioned in image of pictorial food guide

Table 2. Food Plates and related messages in FBDGs of some Southeast Asian countries

	<i>Indonesia</i>	<i>Philippines</i>	<i>Singapore</i>
Name of plate	Piring Makanku: PorsiSekaliMakan (My Food Plate: servings each meal) (Figure 7*)	Pinggang Pinoy (Healthy Food Plate for Filipino Adults) 2014 (Figure 8*)	My Healthy Plate 2014 (Figure 9*)
Division of the plate for major food groups			
Cereals & products, tubers	1/3 of the plate	1/3 of the plate	¼ of the plate (whole grain)
Vegetables	1/3 of the plate	1/3 of the plate	½ of the plate
Fruits	1/6 of the plate	1/6 of the plate	
Milk & milk products	NA	NA	NA
Fish, poultry, meat, eggs, legumes	1/6 of the plate	1/6 of the plate	¼ of the plate
Additional messages outside the plate			
Fat, oil, sugar, salt	Limit intake of sugar, salt and fat/oil	NA	Use healthier oils
Water	1 glass of plain water	1 glass of plain water	Choose water
Physical activity	NA	NA	Be active
Personal hygiene	Wash hands before eating		NA NA

* Figures 7-9 are in Appendix 4

NA = not mentioned in image of plate

different age groups. For the purpose of this compilation and analysis, the DNG Pyramid for Filipino Adults (20-39 years old) is used. The DNG Pyramid serves as a simple, trustworthy guide for the Filipinos in choosing a healthy diet. In accordance with the concept of food pyramids, the Philippines' DNG Pyramid builds from the base and showing that one should eat more foods from the bottom layer. The pyramid has 6 levels. The lowest level, slightly separated from the rest of the pyramid, depicts physical activity and exercise as an essential element of healthy living. The base of the pyramid emphasises the importance of hydration with water and fluids. The next level shows cereals and root crops, followed by vegetables and fruits, the next, fish, meat, poultry, milk, cheese and beans, and the tip of the pyramid shows fats and oils and sugar. The recommended amounts for each food group are shown on the side of the pyramid.

The Healthy Diet Pyramid 2009

(Appendix 3, Figure 4) is the visual tool used to convey healthy eating messages to Singaporeans. Singapore's Healthy Diet Pyramid is a four layer-pyramid, with rice and other complex carbohydrate foods forming the base of the pyramid, followed by fruits and vegetables equally divided at the second level. Meat and other types of protein-rich foods are placed on the third tier; and finally, at the top of the pyramid lie fats, oils, sugar and salt (Lee, 2011). The same general concept of food pyramids is adopted: food eaten daily should come most from the base and least from the tip of the Healthy Diet Pyramid. The number of servings recommended for a day is indicated beside each food group.

Thailand uses Nutrition Flag (Appendix 3, Figure 5) as a visual representation of national Thai food guide in efforts to promote a proper diet for good health (MOPH Thailand, 2001). It is based on the Thai's 'Food-Based Dietary Guidelines for Good Health' and designed

to suggest 'portion', quantity' and 'variety' of food required daily for Thai people. The Nutrition Flag may be likened to an inverted food pyramid and is based on the same principle as the latter. The triangular flag is divided into four levels: the widest at the top shows grains and other starchy foods; the second, divided into a larger vegetable group and a smaller fruit group; the third, divided into two groups – a smaller milk group and a larger meat, legumes and egg group; and the tip of the flag showing oil, sugar and salt. The recommended amounts of the food groups to be consumed are shown in household serving units.

"Proper Nutrition is the Foundation of Good Health" is the theme of Vietnam's pictorial food guide (Appendix 3, Figure 6). The guide is shaped as a pyramid like that of Malaysia, Philippines and Singapore, and follows the same principle. However, the Vietnam pyramid differs from that of the other countries in that it has seven levels depicting common foods consumed in Vietnam, starting with staple foods at the bottom, followed by vegetables in the second level. Fruits are placed in the third level, followed by protein-rich foods in the fourth level. Fats and oils are in the fifth level, sugar in the sixth level, and finally salt occupying the tip of the pyramid. On the right side of the pyramid are stated qualitative recommendations on the relative amounts to be consumed, i.e., eat adequately is advised for staple foods as well as for fruits, eat more is advised for vegetables, eat moderately for protein-rich foods, and for fats and oils, sesame and peanuts, eat less for sugar, and limit intake for salt. On the left side of the pyramid are stated quantitative recommendations of the average intake for an adult for a month: 12 kg of staple food, 10 kg of vegetables, fruits to be consumed as much as possible, 2.5 kg of fish and aqua products, 1.5 kg of meat, and 2 kg of *tofu*, 600 g of fats, oils, sesame and peanuts, 500 g of sugar, and less than 180 g of salt. It can be noted

that these quantitative recommendations differ from food pyramids of countries that provide guidance on amounts to be consumed daily.

Although these are pictorial food guides, some countries have also emphasised the importance of physical activity through these guides. Indonesia added several images of people performing physical activities below the *tumpang* (Appendix 3, Figure 1). Philippines included a key message to do regular exercise at the bottom part of the pyramid (Appendix 3, Figure 4). Vietnam also included two images of physical activity at the bottom of the food pyramid (Appendix 3, Figure 6). Malaysia has taken a different approach and provided a separate physical activity pyramid. In addition, Indonesia also included an image of a person measuring body weight and a glass of water as a reminder of the importance of weight control and water intake. Philippines food pyramid has also included a reminder on importance of personal and environmental hygiene at the bottom. The base of the pyramid has illustrations and messages on drinking enough water and beverages.

The food plate as an additional pictorial food guide

In recent years, some countries have begun to introduce the use of a food plate as an additional pictorial guide to the population. In this region, Indonesia, Philippines and Singapore have introduced the use of their respective food plates.

Indonesia introduced a food plate, *Piring Makan Ku*, or My Food Plate (Appendix 4, Figure 7) to complement the TGS by guiding the selection of appropriate portion size for the different food groups at each meal. The plate is divided into 4 portions or slices, with two large slices of equal size, each occupying a third of the plate, one depicting cereals and root crops and the other, vegetables. The two smaller portions of equal size on the plate each occupying a sixth of the plate, depict

fruits and protein-rich foods respectively.

The *Pinggang Pinoy* or Healthy Food Plate for Filipino Adults (Appendix 4, Figure 8) is an easy to understand visual food plate model developed by the Philippines to help the population adopt a balanced meal and healthy eating habits at meal times (DHRP Philippines, 2014). It can be used side by side with the DNG Pyramid as a simpler illustration of a balanced diet. The plate shows four slices depicting the recommended proportions of the principal food groups to eat in a meal: the larger but equal slices of cereals (represented by rice) and vegetables, together with the smaller but equal slices of fruits (represented by banana) and protein source (represented by fish). The well known classes of foods popular with the population, categorised as "Go", "Grow" and "Glow" foods are at the periphery of the plate. While the *Pinggang Pinoy* conveys the right proportions of the major food groups, the Pyramid shows recommendations for the whole day food intake.

A study conducted by Health Promotion Board Singapore (HPB Singapore, 2014) indicated that Singaporeans prefer a simple, plate-based image that conveys clear messages about a healthy diet. Thus, My Healthy Plate was developed in 2014 with the aim to provide an easy-to-understand visual representation of a balanced and healthy diet that can help with weight control and protect against chronic diseases (HPB Singapore, 2014)(Appendix 4, Figure 9). The Plate is divided into 3 portions; fruits and vegetables occupy half of the plate, brown rice & wholemeal bread a quarter and meat & others occupy the remaining quarter. The Plate emphasises on increasing fruit and vegetable intake and changing rice, noodles, bread and other carbohydrate-rich foods to whole-grain options.

Besides providing guidance on the amounts of the main food groups to be consumed in each meal, all the 3 plates also provide additional related messages

outside the plate. In the Indonesian My Food Plate, three other messages are also included by the side of the plate through text and/or images, namely drink sufficient water, wash hands before meals and reduce intake of sugars, salt and fats/oil (Figure 7). The Philippines Healthy Food Plate also has added a glass of water by the side of the plate (Figure 8). In the case of the Singapore My Healthy Plate, three additional messages and images have been included to remind Singaporeans to choose water over sweetened beverages, choose foods prepared with healthier oil as well as be being physically active (Figure 9).

DISCUSSION

Comparison of the main pictorial food guides

All the FBDGs of the six Southeast Asian countries in this survey have their own pictorial food guides to assist the public in making food choices and appropriate amounts. While they are different in their visual presentations - Indonesia's guide is in the form of an culinary iconic rice dish (*tumpeng*) and Thailand's is an inverted triangular flag, while that of Malaysia, Philippines and Singapore are standing pyramids - they are in fact similar in their essential attributes. Firstly, all the pictorial guides are based on the principle of relativity or proportionality of the different food groups to consume, placed at different levels of the pictorial guide. Foods placed at the broader part of the guide are to be consumed more than those at the upper/lower parts of the structure. The pictorial guides basically have four to five layers. Although the Vietnam pyramid has seven layers, the last three at the tip are basically further elaboration of fats/oils, sugar and salt.

The major food groups depicted in the pictorial guides are strikingly similar for all the countries, reflecting similarities in dietary pattern of communities in the region. They comprise cereals (most often rice), grains and tubers; vegetables;

fruits; meat, fish, poultry, egg and legume products; milk and milk products; fats/oil, sugar and salt. Furthermore, the recommendations for the relative consumption of the different food groups are very similar for all the countries. Staples like cereals and products and tubers form the largest layer and hence are recommended to be consumed the most, relative to the other groups. These foods are recognised by all the six countries to be the major suppliers of dietary energy. The second largest layer is vegetables and fruits, recommended to be consumed more. This indicates the general agreement amongst countries that these are good sources of micronutrients, phytonutrients and dietary fibre. The next smaller layer, further up/or down the pictorial guide are foods such as meat, poultry, fish, eggs. All the countries have also placed legumes and products in this level as alternatives to meat products. These protein-rich foods provide the main dietary components for growth and maintenance of body tissues and are recommended for consumption in moderate amounts. Fats/oils, sugar and salt are invariably the smallest layer of the pictorial guide, placed at the tip. There is general agreement that they are to be consumed the least as they are linked to various diet-related chronic diseases.

All the pictorial food guides have also placed a variety of foods with similar nutritional value for each food group within the same level. The public is advised to consume a variety of foods within each food group, using the different foods as alternatives.

Thus all the pictorial food guides clearly illustrate the major elements that constitute a normal diet – variety, proportionality and balance, at the same time conforming to the main message of their respective FBDGs and the cultural practices of the countries.

However, there are noticeable differences in the various pictorial food guides (Table 1). Milk and dairy

products are grouped together with other protein-rich foods in the case of the guides in Indonesia and Singapore. On the other hand, these foods are given greater emphasis in the case of Malaysia, Philippines and Thailand, being distinctly separated, though on the same level of the pyramid, and the recommended amount for consumption is provided.

The countries in the survey adopted different approaches to present the recommendations for the consumption of the various food groups. Indonesia, Philippines and Thailand used quantitative recommendations for all food groups in the visual guides. Thailand's pictorial guide has also adopted a quantitative recommendation for all food groups except for fat/oil, sugar and salt. No country's pictorial guide has used only qualitative terms. Malaysia, Singapore Vietnam have provided both quantitative and qualitative recommendations. The latter include terms such as eat adequately, eat plenty, select more, eat in moderation and use or select less. There are pros and cons in the use of quantitative or qualitative approaches. The public may find the use of quantitative approaches such as the use of serving or portion sizes too difficult to comprehend and use. The use of qualitative description terms presumably help in consumer understanding of the recommendations in the pictorial guides. However, they are rather non-specific and may not be helpful to the public. Perhaps that is the reason why some countries have opted to use both approaches.

In terms of quantitative recommendations, there are considerable differences in the recommended amounts of the various food groups and the modes of expression. Thailand uses household serving units i.e. rice-serving spoons, tablespoons and glasses as units of measurement; Vietnam uses gram or kilogram, while the others use customary serving size. While the recommended amounts of the food groups in the

pictorial guides of Indonesia, Malaysia, the Philippines, Singapore and Thailand are for a day's intake, the quantitative recommendation in the case of Vietnam's guide is for the average intake of an adult for a month.

A range of servings (e.g. 2-3 servings) has been recommended for some food groups for some of the countries, especially for rice and the cereal grains group, meat, fish and eggs group and milk and milk products group. For fat/oil, sugar and salt, Philippines and Vietnam have placed these in separate levels of the food pyramid and also provide quantitative recommendations in teaspoons and grams respectively. The other four countries recommended these be consumed "the least" or "to reduce consumption" with no quantitative amounts.

It is noteworthy that the pictorial food guides of Indonesia and the Philippines have included several other recommendations, namely importance of personal hygiene, physical activity, monitoring body weight and drinking water. Vietnam has included a message to encourage physical activity through the use of two images at the bottom of the pyramid. Malaysia has a separate pictorial guide for physical activity, in the form of a pyramid that gives recommendations on the form and frequency of various types of activities. It follows the same principle of a food pyramid in that activities depicted at the bottom and larger layer of the pyramid are to be carried out more often than those at the higher levels.

An earlier review of pictorial food guides used in 12 countries from different parts of the globe by Painter, Rah & Lee (2002) also reported similar findings. A variety of shapes of pictorial food guides were reported in the review, including pyramids, circle, pagoda, rainbow and plate. In spite of these differences in the shapes of the guides, there was a remarkable similarity in the basic food groupings of

the guides in all countries. There were minor differences in food categorisation and differences in recommended serving sizes. However, it was reported that the core recommendation for individuals to consume large amounts of grains, vegetables and fruits with moderate intake of meat, milk and dairy products was consistent in all the pictorial food guides included in that review. Although the review was carried out over a decade ago, it can be noted that the recommendations in all the international food guides have recommended consumption of cereal grains (high carbohydrate foods) the most, as in the case of the food guides in the present study.

Comparison of food plates

It is interesting that in recent years, Indonesia, the Philippines, and Singapore have begun to use the food plate, in addition to the food pyramid (Table 2). The food plates used in all three countries are simple nutrition education tools that impart the message of balance and proportionality among the major food groups - energy-rich foods, foods rich in micronutrients and dietary fibre, and protein-rich foods. However, there are several differences in the way the food plates are presented. While those of Indonesia (Appendix 4, Figure 7) and the Philippines (Appendix 4, Figure 8) have four slices on the plate, that of Singapore has only three (Appendix 4, Figure 9). Those of Indonesia and the Philippines show equal slices for energy-rich foods and vegetables and smaller but equal slices of fruits and protein-rich foods. Both the food plates of Indonesia and the Philippines include a glass of water to remind the population of the need for proper hydration. In the case of the Philippines plate, the terms "Go", "Grow" and "Glow" are used in association with staple foods, protein-rich foods and vegetables and fruits respectively. These terms are used on the plate as they have

been used in nutrition education for a long time and are familiar to the population. The food plate of Singapore (Table 2, Figure 9) has only 3 slices with fruit and vegetables occupying half of the plate, and brown rice and wholemeal bread, and meat and others, occupying one fourth of the plate each, signifying the relative importance of these food groups to the recommended Singaporean diet.

CONCLUSIONS

All the six Southeast Asian countries in this compilation of country FBDGs have recognised the usefulness and importance of a pictorial food guide to assist the population in making food choices. The six pictorial food guides analysed in this paper, contained in the FBDGs of Indonesia, Malaysia, the Philippines, Thailand, Singapore, and Vietnam, while differing in their visual presentations, are based on the same concept and are similar in their essential attributes. There are, however, some differences in details, for example, the different ways by which milk, fats and oils, sugar, salt, physical activity, and water are depicted, showing the differing emphasis placed on these food items by the countries. There are also minor differences in recommended amounts and the units of measurements used.

While food pyramids and similar guides provide a visual guide to the concept of relativity of the different food groups to consume, food plates provide guidance to the consumer on the relative amounts of major food groups for a specific meal. The food plate has therefore been felt useful for purposes of individual counselling. Indonesia, Philippines and Singapore have introduced food plates as additional educational guides to consumers. Malaysia is also currently developing a plate to complement the food pyramid. The general principle and concept of the food plates of the three countries are similar. However, there are also differences in terms of the

sizes of the slices depicting the four major groups.

On the whole, the pictorial food guides and food plates of the countries surveyed have the same common purpose of encouraging the population to adopt a healthy diet based on the principles of variety, proportionality and balance. They all aim to function as simple nutrition education tools to teach the concept of a nutritious and balanced diet to the general public.

All the food pyramids and similar pictorial food guides reviewed have included recommended serving sizes for the different food groups. These are usually in the form of recommended amounts to be consumed in a day. Examples of what is a serving of the various food groups are often provided. One main difficulty in educating the population on the use of food pyramids and similar guides is in explaining serving sizes. Consumers often find it difficult to understand and imagine what is the serving size of a particular food group. There has to be a better understanding of how consumers perceive food pyramids and the related serving sizes. This will enable greater efforts to encourage the public to make use of these visual guides in making appropriate food choices.

In recent years, food plates have become acceptable additional visual tools in more countries in the region. It is important to monitor how consumers understand these new tools and if they are indeed useful in helping consumers make food choices.

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Conflict of interest

The authors declare that they have no conflict of interest in undertaking this work.

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Appendix 3. Images of pictorial food guides and related key messages used in FBDGs of six Southeast Asian countries

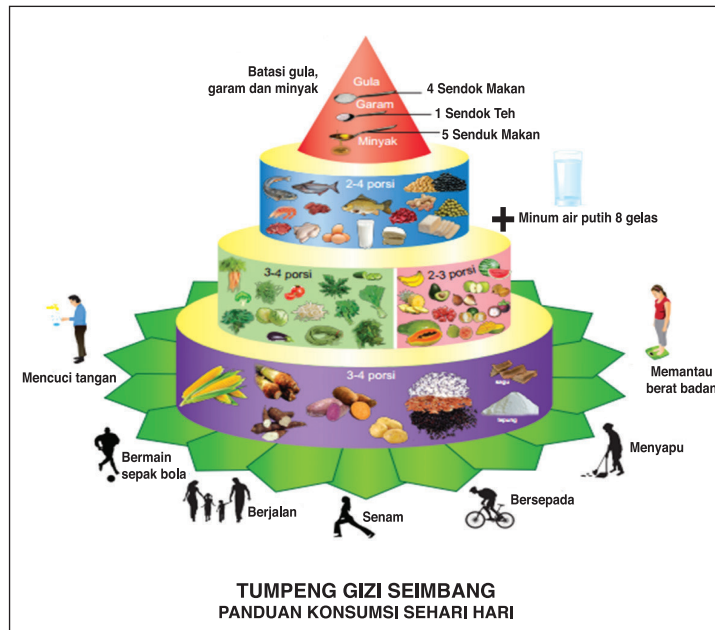


Figure 1. *Tumpeng Gizi Seimbang* of Indonesia

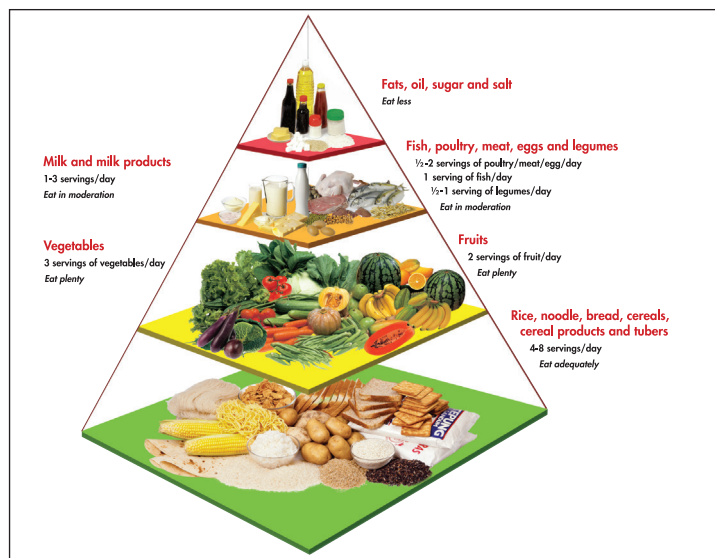


Figure 2. Malaysian Food Pyramid 2010

Appendix 3. — Continued

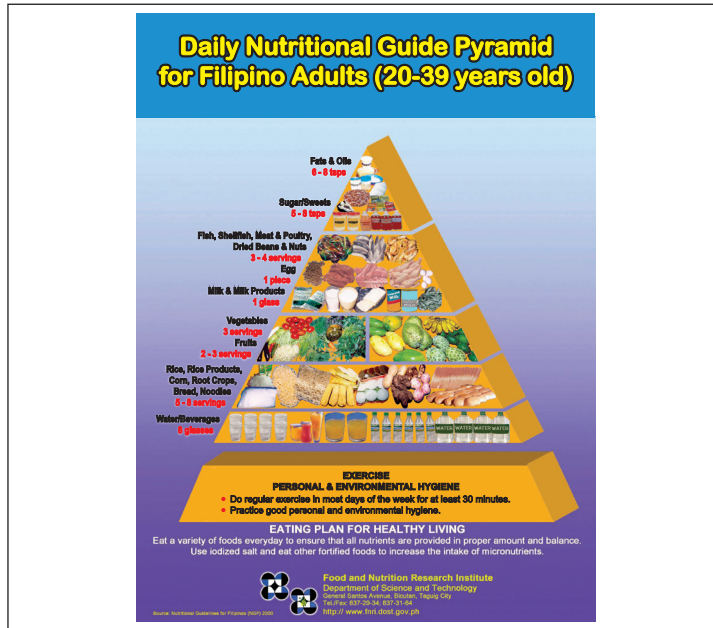


Figure 3. Daily Nutritional Guide Pyramid for Filipino adults

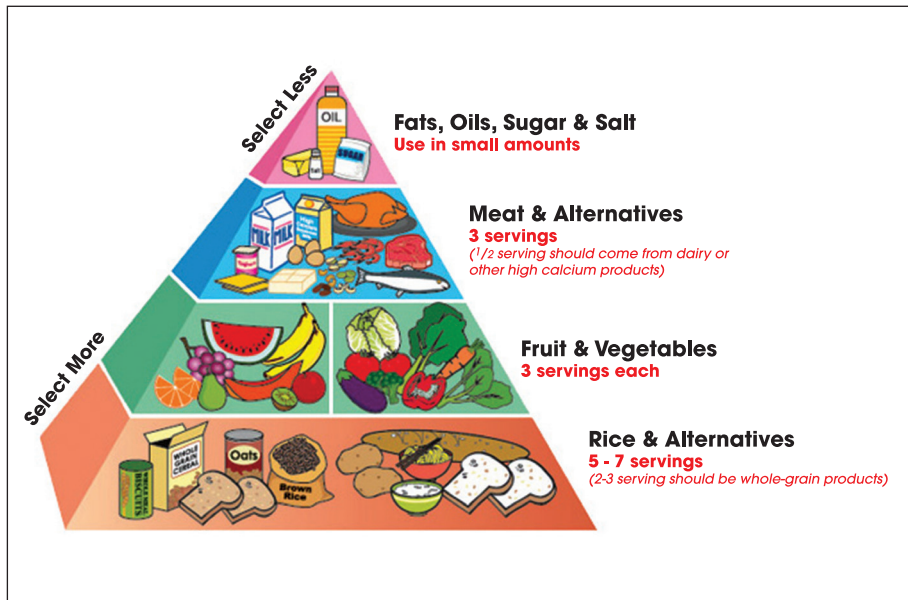


Figure 4. Singapore's Healthy Diet Pyramid 2009

Appendix 3. — Continued



Figure 5. Nutrition Flag Healthy Eating for Thais

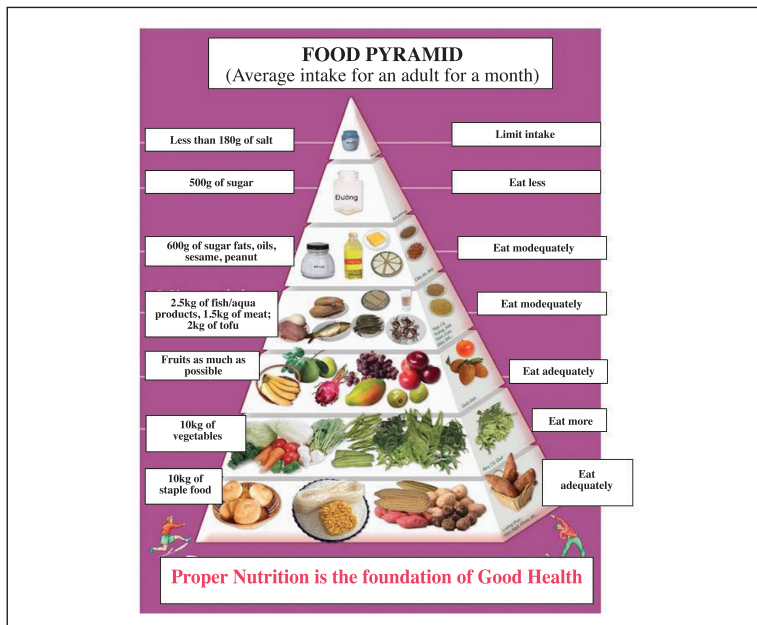


Figure 6. Vietnam Food Guide Pyramid

Appendix 4. Images of food plates and related messages used in FBDGs of some Southeast Asian countries

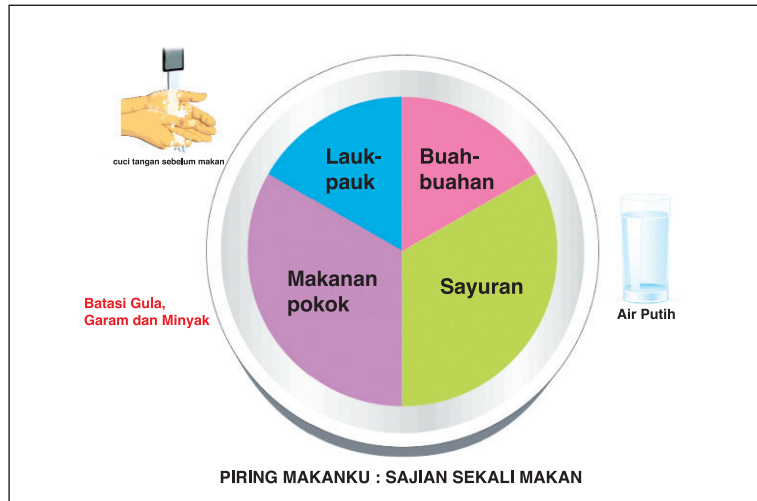


Figure 7. My Food Plate (servings each meal) of Indonesia
Piring Makan ku: Porsi Sekali Makan



Figure 8. Healthy Food Plate for Filipino adults, 2014 of the Philippines (*Pinggang Pinoy*)

Appendix 4. — Continued



Figure 9. My Healthy Plate 2014, Singapore

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