

REVIEW

Food-based dietary guidelines in Southeast Asian countries: A comparison and update

E Siong Tee^{1,2*}, Maria Regina A. Pedro³, Visaratana Therakomen⁴, Mahenderan Appukutty^{1,2,5}, Hardinsyah Ridwan^{1,6}, Truong Tuyet Mai^{1,7} & Siok Hui Voon^{1,2}

¹Southeast Asia Public Health Nutrition Network; ²Nutrition Society of Malaysia, No. 27C, Jalan P.U. 7 (PJS 1/48), P.J. Selatan 46000 Petaling Jaya, Selangor Darul Ehsan, Malaysia; ³Nutrition Foundation of the Philippines, Inc., Dr. Juan Salcedo, Jr. Bldg. 107 E. Rodriguez, Sr. Avenue, Quezon City 1102; ⁴Bureau of Nutrition, Department of Health, Ministry of Public Health, Thailand, 88/22 Moo 4 Tiwanon Road, Talat Khwan sub district, Mueang Nonthaburi district, Nonthaburi 11000; ⁵Sports Science Programme Faculty of Sports Science & Recreation, Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor, Malaysia; ⁶Food and Nutrition Society of Indonesia (Pergizi Pangan); c/o Department of Community Nutrition, Faculty of Human Ecology (FEMA), IPB University, Dramaga - Bogor 16680, Indonesia; ⁷National Institute of Nutrition Vietnam, 48B Tang Bat Ho Street, Hanoi, Vietnam

Abstract

Countries in the Southeast Asian region have revised their national food-based dietary guidelines (FBDGs) in response to the public health and nutrition priorities. As a continuous effort to facilitate regional networking, the Southeast Asia Public Health Nutrition Network publishes this review as an update of its previous publication in 2016. This review provides an updated descriptive overview of current FBDGs for the general adult population in Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. It summarises and compares commonalities and differences in key dietary messages and visual communication tools across countries. The findings indicate strong regional alignment on core dietary recommendations, including consuming a balanced and varied diet with foods from all food groups, prioritising vegetables and fruits, prioritising minimally processed grains or whole grains starchy staples, practising moderation in protein intake from both animal and plant sources, limiting foods high in fats/oils, sugar and salt, being physically active and maintaining a healthy body weight. Pictorial food guides, such as food pyramids and healthy plates, are widely used, with variations in design that reflect cultural contexts to enhance public understanding. While countries acknowledge the importance of FBDGs, effective dissemination and adoption remain challenging due to limited resources, weak cross-sectoral collaboration, and unsupportive food environments. This review highlights the need for stronger communication strategies, improved understanding of consumer barriers, systematic monitoring and evaluation, inclusion of guidance on away-from-home meals, strengthened multi-stakeholder collaboration across the food supply chain, and enhanced regional collaboration to support effective FBDGs implementation in Southeast Asia.

Keywords: Food-based dietary guidelines, pictorial food guide, Southeast Asia

*Corresponding author:

Dr Tee E Siong,

Chairman, Southeast Asia Public Health Nutrition (SEA-PHN) Network

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INTRODUCTION

A healthy diet promotes growth and development and prevents malnutrition in all its forms, including undernutrition and nutrient deficiencies and dietary factors that increase the risk of obesity and non-communicable diseases (NCDs) (FAO/WHO, 2019). To support the overall nutritional well-being of the population, the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO) have long advocated the development of country-specific food-based dietary guidelines (FBDGs) that are adapted to national nutrition situations, culinary cultures and dietary habits (FAO/WHO, 1998), and aligned with the principles of sustainable healthy diets, taking into account each country's economic, cultural, social and environmental aspects (FAO/WHO, 2019).

Since the landmark 1998 WHO/FAO publication on 'Preparation and Use of FBDGs' (FAO/WHO, 1998), countries around the world have developed and periodically revised FBDGs tailored to their respective contexts. Beyond the traditional focus on food groups and dietary patterns for health, many now incorporate wider considerations, such as food safety, lifestyle and sustainability, into these guidelines (FAO, 2024).

It is of importance to tailor FBDGs to respond to a country's public health and nutrition priorities, food production and consumption patterns, sociocultural influences and nutritional landscape, along with periodic revisions to provide up-to-date dietary recommendations. This is particularly important for Southeast Asia (SEA) as countries in the region have undergone significant socio-economic development, as well as nutrition transition, over the past few decades, resulting in marked changes in lifestyle and dietary habits. Many SEA countries are now grappling with the double burden of malnutrition, characterised by simultaneous challenges of undernutrition and overnutrition, as well as micronutrient deficiencies (Rachmi, Li & Baur, 2018; Tee *et al.*, 2020).

In recognition of the public health importance of FBDGs, the Southeast Asia Public Health Nutrition (SEA-PHN) Network previously published two review papers analysing the key messages of FBDGs and pictorial food guides from six SEA countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam) offering insights and recommendations for other countries in the region intending to establish or review their FBDGs (Tee *et al.*, 2016; Florentino *et al.*, 2016). As several countries, including Malaysia, Thailand and Vietnam, have revised their FBDGs, this paper aims to update those reviews, analyse current FBDGs in six countries (Brunei Darussalam, Indonesia, Malaysia, Philippines, Thailand and Vietnam) and the initiatives taken to promote and disseminate FBDGs messages.

METHODOLOGY

This paper is based primarily on the latest FBDGs published by national nutrition and health authorities and available on the respective official websites. For documents not available online, the official FBDGs were provided by the relevant national authorities. The FBDGs included in this review are the National Dietary Guidelines (NDGs) for Healthy Eating Brunei Darussalam 2020 (MOH Brunei Darussalam, 2020), Indonesia's *Pedoman Gizi Seimbang* (Guide to Balanced Nutrition) 2014 (MOH Indonesia, 2014), Malaysian Dietary Guidelines (MDG) 2020 (NCCFN, 2021), Nutritional Guidelines for Filipinos (NGF): A Prescription

to Good Nutrition 2012 (FNRI-DOST, 2015), Thai Food-Based Dietary Guidelines 2022 for the General Population (MOPH Thailand, 2022; Therakomen *et al.*, 2023) and Vietnam's 10 Tips on Proper Nutrition until 2030 (MOH Vietnam, 2024). As the complete English versions of the Thai FBDG 2022 and Vietnam's 10 Tips on Proper Nutrition until 2030 are not available online, relevant information on these updated FBDGs was provided by the respective national authorities/co-authors from Thailand and Vietnam.

The approach used to summarise and analyse these FBDGs was descriptive and comparative. Key messages in these FBDGs were examined, categorised and compared based on recommendations on consuming a variety of foods, food groups, food components to limit, and other dietary practices and healthy lifestyle behaviours. The pictorial guides used to communicate key messages and further assist the public in understanding and adopting the recommendations were also compared. Similarities and differences in key messages and pictorial guides were discussed.

RESULTS

Overview of FBDG development in SEA

Most countries first published their FBDGs in the 1990s, including Indonesia, Malaysia, the Philippines and Vietnam. Thailand introduced its FBDGs as early as 1985, while Brunei Darussalam developed its first FBDGs in 2000. These guidelines have been developed and published by national nutrition and health authorities and are reviewed periodically, citing evolving scientific evidence in nutrition and public health, as well as changes in dietary habits and lifestyles impacting the prevalence of NCDs, as the main factors prompting the revision.

Brunei Darussalam's NDGs 2000 were revised in 2020 to align with updated scientific knowledge and to address evolving dietary patterns and lifestyles associated with the increasing prevalence of NCDs (MOH Brunei Darussalam, 2020). The current NDGs 2020 present 11 key messages and 28 recommendations. Indonesia's dietary guidelines were reviewed in 2010 in response to persistent undernutrition and an increasing prevalence of degenerative diseases. The revised guidelines, known as '*Pedoman Gizi Seimbang*' (PGS) (Guide to Balanced Nutrition), were published as Regulation No. 41 of 2014 (MOH Indonesia, 2014) and comprise 10 key messages intended for healthy adults in the general population. The PGS 2014 remains in use.

Malaysia revised its MDG 2010 in 2020, in line with the updated Recommended Nutrient Intakes for Malaysian 2017 and taking into consideration the current nutritional status of Malaysians and the latest scientific evidence. The MDGs 2020 comprise 14 key messages and 52 recommendations. In the Philippines, the Nutritional Guidelines for Filipinos (NGF): A Prescription to Good Nutrition, comprising 10 key messages, remains the current FBDGs. The Philippines' FBDG were last reviewed in 2012-2013 based on findings from the 2008 and the 2013 National Nutrition Surveys to address the evolving triple burden of malnutrition (FNRI-DOST, 2015).

In Thailand, following the release of the Dietary Reference Intake for Thais 2020, the FBDGs were revised in 2021 to include both qualitative and quantitative key recommendations for different age groups. Qualitative recommendations for all age groups were completed in 2022, while quantitative recommendations for

pregnant women and lactating women, infants and young children aged 6 months to 5 years, and older adults were completed in 2023. Quantitative recommendations for school-aged children and adolescents were finalised in 2024. Vietnam's latest FBDGs, "10 Tips on Proper Nutrition until 2030", comprise 10 key messages and were developed based on the National Nutrition Strategy for the 2021-2030 period (Phuong, 2022). Its development was part of the action plan for implementing the National Nutrition Strategy by 2025.

Beyond providing country-specific guidance on healthy eating to promote health and prevent diseases, FBDGs in these countries also serve as blueprints for the development and implementation of nutrition-related programmes and policies. Table 1 presents the actual wording of the key messages in the FBDGs of the six countries reviewed. A total of 20 topics or key messages were identified across these FBDGs. Table 2 summarises the presence or absence of key messages related to these topics in the FBDGs of the six countries.

Recommendations on variety and balance in food choices

A key message encouraging the consumption of a variety of foods is consistently presented as the first key message in the FBDG of all six countries, with similar phrases such as "eat/enjoy a variety of foods". This highlights the crucial role of variety in promoting a healthy diet. Supporting explanatory notes or recommendations of these countries commonly emphasise the inclusion of a variety of foods from all major food groups. Brunei Darussalam, Indonesia, Malaysia, and the Philippines provide detailed explanations on the roles of different food groups, their health benefits, and recommended servings. The scientific rationales for recommending dietary variety are consistent across countries, citing that no single food can provide all essential nutrients, and that dietary variety ensures nutrient adequacy, improves diet quality and reduces disease risk. The Philippines further provides detailed recommended amounts for each food group across different life stages. Countries use different measurement units to describe recommended intakes, including servings, portions, rice-serving spoon and grams per day.

Recommendations on food groups

Cereals and grains

Cereals and grains are fundamental staples across Southeast Asia. All countries except the Philippines include a specific key message encouraging adequate or varied consumption of cereals and grains, using similar qualitative terms such as "eat adequate amount/eat variety of/base meal on rice, grains/staple food". In the Philippines, cereals and grains are addressed within the key message on dietary variety. Quantitative daily recommendations of these staple foods and the number of servings are summarised in Table 3. The main cereals and grain foods recommended include rice, noodles or pasta, bread, cream/wholegrain crackers, potato/sweet potato, oats and corn. The number of servings per day of these staple foods varies considerably among countries, probably based on the recommended energy intake of the respective countries. Brunei Darussalam recommends 6-8 servings of these staple foods; the Philippines recommends similar amounts of 5-8 servings; Indonesia recommends 3-4 portions, Malaysia recommends 3-5 servings, Thailand recommends 8-12 servings, while Vietnam recommends 12-15 servings. Direct comparison of the recommended amounts of these staple foods based on the number of servings is not feasible because of the differences in measurement

Table 1. Key messages of FBDGs of six Southeast Asian countries

Country	Name of FBDG and year published	Lead organisation in FBDG formulation	No. of Key Messages/ recommendations	Key messages in FBDG
Brunei Darussalam	National Dietary Guidelines (NDG) for Healthy Eating Brunei Darussalam 2020	Technical Working Group of the National Dietary Guidelines, Ministry of Health	11/28	The 11 key messages of NDG are as follows: 1. Enjoy a wide variety of nutritious foods daily within the recommended amount 2. Maintain calorie intake balanced with regular physical activity to keep body weight in a healthy range 3. Base meal on rice, bread, potatoes, pasta, noodles or other starchy carbohydrates, with at least half from wholegrain 4. Eat at least two servings of fruits and three servings of vegetables everyday 5. Eat fish, poultry, lean meat, legumes, nuts and other proteins in moderation 6. Limit intake of fatty foods and use the recommended cooking oil sparingly 7. Reduce intake of sugary foods and beverages 8. Reduce salt and sauces in cooking and food preparations, and choose foods with less salt 9. Practice exclusive breastfeeding for the first six months and continue breastfeeding until two years while giving nutritious, complementary foods from six months of age 10. Prepare and consume foods and beverages that are clean and free from contaminations 11. Read and understand food labels to make healthier choices
Indonesia	<i>Pedoman Gizi Seimbang</i> 2014 (Guide to Balanced Nutrition)	Ministry of Health	10/0	The 10 key messages of <i>Pedoman Gizi Seimbang</i> 2014 are as follows: 1. Enjoy a variety of foods (<i>Syukuri dan nikmati aneka ragam makanan</i>) 2. Eat plenty of vegetables and sufficient fruits (<i>Banyak makan sayuran dan cukup buah-buahan</i>) 3. Consume foods that are high in protein (<i>Biasakan mengonsumsi lauk pauk yang mengandung protein tinggi</i>) 4. Eat variety of staple food (<i>Biasakan mengonsumsi aneka ragam makanan pokok</i>) 5. Limit intake of foods high in sugar, salt and fat (<i>Batasi konsumsi pangan manis, asin dan berlemak</i>). 6. Eat breakfast regularly (<i>Biasakan sarapan</i>) 7. Drink adequate amount of safe plain water (<i>Biasakan minum air putih yang cukup dan aman</i>) 8. Read the food labels of packaged foods (<i>Biasakan membaca label pada kemasan pangan</i>) 9. Wash hand with soap and clean running water (<i>Cuci tangan pakai sabun dengan air bersih mengalir</i>) 10. Do adequate physical activities and maintain normal body weight (<i>Lakukan aktivitas fisik yang cukup dan pertahankan berat badan normal</i>)

(To be continued)

Table 1. Key messages of FBDGs of six Southeast Asian countries (*continued*)

Country	Name of FBDG and year published	Lead organisation in FBDG formulation	No. of Key Messages/ recommendations	Key messages in FBDG
Malaysia	Malaysian Dietary Guidelines (MDG) 2020	National Coordinating Committee on Food and Nutrition, Ministry of Health Malaysia	14/52	The 14 key messages of MDG 2020 are as follows: 1. Eat a variety of foods within the recommended servings 2. Achieve and maintain a healthy body weight 3. Be physically active everyday 4. Cook nutritious foods at home more often and choose healthier options when eating out 5. Eat plenty of vegetables and fruits everyday 6. Eat adequate amount of rice, other cereals, whole grain cereal-based products and tubers 7. Consume moderate amount of fish, meat, poultry, egg, legumes and nuts 8. Consume adequate amounts of milk and milk products 9. Reduce intake of foods high in fat and limit saturated fat intake 10. Choose and prepare foods with less salt, sauces and flavour enhancers 11. Limit sugar intake in foods and beverages 12. Drink plenty of water daily 13. Consume safe and clean foods and beverages 14. Make effective use of nutrition information on food labels
Philippines	Nutritional Guidelines for Filipinos (NGF): A Prescription to Good Nutrition (2012)	Technical Working Group for the revision of the NGF, formed by the Food and Nutrition Research Institute. Department of Science and Technology, Republic of the Philippines	10/0	The 10 key messages of NGF 2012 are as follows: 1. Eat a variety of foods everyday to get the nutrients needed by the body 2. Breastfeed infants exclusively from birth up to 6 months then give complementary foods while continuing breastfeeding for 2 years and beyond for optimum growth and development 3. Eat more vegetables and fruits everyday to get the essential vitamins, minerals and fibre for regulation of body process 4. Consume fish, lean meat, poultry egg, dried beans or nuts daily for growth and repair of body tissues 5. Consume milk, milk products and other calcium-rich foods such as small fish and shellfish everyday for healthy bones and teeth 6. Consume safe foods and water to prevent diarrhea and other food and water-borne diseases 7. Use iodized salt to prevent Iodine Deficiency Disorders 8. Limit intake of salty, fried, fatty and sugar-rich foods to prevent cardiovascular diseases 9. Attain normal body weight through proper diet and moderate physical activity to maintain good health and help prevent obesity 10. Be physically active, make healthy food choices, manage stress, avoid alcoholic beverages and do not smoke to help prevent life-style related non-communicable diseases

(To be continued)

Table 1. Key messages of FBDGs of six Southeast Asian countries (*continued*)

Country	Name of FBDG and year published	Lead organisation in FBDG formulation	No. of Key Messages/ recommendations	Key messages in FBDG
Thailand	Thai Food-Based Dietary Guidelines 2022 (General Population, Qualitative Guidelines)	Thai-FBDGs working committee formed by Department of Health, Ministry of Public Health Thailand	9	The 9 key messages are as follows: 1. Eat a variety of food from all of the six main food groups based on the recommended proportions in Thai nutrition flags and maintain proper weight 2. Eat rice as the main energy source, especially brown rice and half-milled rice, and eat alternative starchy food sometime 3. Eat fish, eggs, lean meat, and legumes regularly 4. Eat plenty of vegetables and fruits, especially colourful vegetables and fruits regularly, and avoid high sugar fruits 5. Drink plain milk and consume high calcium foods 6. Avoid high fat, sugar, and salt food 7. Eat clean and safe foods and freshly prepared meals 8. Drink adequate amount of clean water and avoid sweetened beverages 9. Avoid or reduce alcoholic beverage
Vietnam	10 Tips on Proper Nutrition to 2030	National Institute of Nutrition (spearheaded the development)	10	The 10 key messages are as follows: 1. Eat a sufficient, balanced and diverse variety of foods daily; properly combine animal-based and plant-based foods. 2. Daily consume foods rich in micronutrients and various colorful vegetables and fruits. Read nutrition labels carefully before purchasing and using. 3. Consume protein-rich foods appropriately; prioritise fish, poultry, and nuts/ seeds in daily meals; limit red meat consumption. 4. Drink enough water everyday 5. Pregnant women and breastfeeding mothers should follow a rational diet; supplement iron, and folic acid or multivitamins as instructed. 6. Breastfeed infants early within the first hour after birth; practice exclusive breastfeeding for the first 6 months; provide appropriate complementary feeding and continue breastfeeding until 24 months or older. 7. Limit the consumption of fried foods, greasy fast foods, foods high in salt or sugar, and sugar-sweetened or alcoholic beverages. 8. Ensure safety in selecting, processing, and storing food. 9. Organise family meals well. Eat adequate meals (breakfast, lunch, dinner) suitable for each age group; do not overeat or skip meals. 10. Maintain and control a healthy weight; adopt an active lifestyle and increase physical activity suitable for age and health condition.

Table 2. Food groups and selected topics in FBDGs of six Southeast Asian countries

Food group/Topic	Country					
	Brunei Darussalam	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Variety of foods	/	/	/	/	/	/
Cereals and grains	/	/	/	/	/	/
						Combined with “increase the use of foods rich in micronutrients”
Fruits & vegetables	/	/	/	/	/	/
						Combined with “increase the use of foods rich in micronutrients”
Fish, meat, poultry, eggs & legumes	/	/	/	/	/	/
		included in the key message ‘Consume foods that are high in protein’				Combined with “Use protein-rich foods wisely”; and ‘consume red meat in moderation”
Milk & milk products	X	X	/	/	/	X
	No specific message; covered under “Enjoy a wide variety of nutritious foods daily”	No specific message; included in ‘Consume foods that are high in protein’				No specific message; included in the pictorial food guide nutritional pyramid
Water	X	/	/	X	/	/
				No specific message; covered under “eating a variety of foods everyday”		

(To be continued)

Table 2. Food groups and selected topics in FBDGs of six Southeast Asian countries (*continued*)

Food group/Topic	Country					
	Brunei Darussalam	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Salt	/	/	/	/	/	/
					Salt, sugar, fats in 1 message	Combine with 'Limit the consumption of fried foods, fast foods high in fat, and foods high in salt, sugar, sugary drinks, and alcohol'
Sugar	/	/	/	/	/	/
					Salt, sugar, fats in 1 message	Combine with 'Limit the consumption of fried foods, fast foods high in fat, and foods high in salt, sugar, sugary drinks, and alcohol'
Fats & oils	/	/	/	/	/	/
					Salt, sugar, fats in 1 message	Combine with 'Limit the consumption of fried foods, fast foods high in fat, and foods high in salt, sugar, sugary drinks, and alcohol'
Alcohol	X	X	X	/	/	/
						Combine with 'Limit the consumption of fried foods, fast foods high in fat, and foods high in salt, sugar, sugary drinks, and alcohol'

(To be continued)

Table 2. Food groups and selected topics in FBDGs of six Southeast Asian countries (*continued*)

Food group/ Topic	Country					
	Brunei Darussalam	Indonesia	Malaysia	Philippines	Thailand	Vietnam
Healthy body weight	/	/	/	/	/	/
	Combined with physical activity	Combined with physical activity			Combined with eat a variety of food	Combined with physical activity
Physical activity	/	/	/	/	X	/
						Combined with maintain and control weight
Breastfeeding	/	X	X	/	X	/
		No specific message; importance of exclusive breast feeding emphasised in Chapter II of the FBDG on Principles of Balanced Nutrition	Emphasised in a separate Dietary Guideline for Children and Adolescents		Dietary recommendations for breastfeeding within the context of the FBDGs for young children aged 0-5 years	
Food safety	/	X	/	/	/	/
		No specific message; food poisoning prevention is emphasised in the key message on personal hygiene				
Food and nutrition labels	/	/	/	X	X	/
						Combine with the key message 'Consume foods rich in micronutrients daily, including vegetables, tubers, and fruits of different colours. Read the nutritional information on food labels carefully before buying and using.'

(To be continued)

Table 2. Food groups and selected topics in FBDGs of six Southeast Asian countries (*continued*)

Food group/Topic	Country					
	<i>Brunei Darussalam</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Vietnam</i>
Cooking/Meal at home	X	X	/	X	X	/
Breakfast	X	/	X	X	X	/
Personal hygiene	X	/	X	X	X	X
Pregnancy	X	X	X	X	X	/
Use of fast foods	X	X	X	X	X	/

Combine with the key message 'Organize family meals effectively. Eat enough meals (breakfast, lunch, dinner) appropriate to your age; do not overeat or skip meals'

Combine with the key message 'Organize family meals effectively. Eat enough meals (breakfast, lunch, dinner) appropriate to your age; do not overeat or skip meals'

Emphasised in a separate Maternal Dietary Guidelines

Dietary recommendations for pregnancy within the context of the FBDGs for pregnant women

Table 3. Quantitative daily recommendations for cereals and grain foods, and examples of one serving across countries

<i>Country</i>	<i>Recommended number of servings for cereals & grains</i>	<i>Example of 1 serving</i>
Brunei Darussalam	6-8 servings/day	1 scoop of rice, noodles or pasta (75-120g) / 1 slice of bread (40g) / 3-4 tablespoons of uncooked oats / 2-3 pieces (30g) of cream crackers / 6-8 tablespoons of breakfast cereals/ ½ medium-sized potato
Indonesia	3-4 portions/ day	1 portion = ¾ cup (100g) cooked rice/ 2 cups wet noodles (200g) / 2 medium-sized potatoes (210g) / 3 slices of bread (70g) / 1 medium-sized sweet potato (150g)
Malaysia	3-5 servings/day (Based on 30g carbohydrate per serving)	2 rice scoops of cooked rice / 1 cup noodles, <i>kuetiau</i> / 1 ½ cups cooked spaghetti / 2 cups cooked porridge / 1/3 medium ear of cooked corn without skin and cob/ 2 square slices of bread / 6 dessert spoons uncooked oats / 2 whole medium-sized potatoes/ 5 pieces wholemeal crackers
Philippines	5-8 servings/day	1 cup boiled rice / 1 cup cooked macaroni or spaghetti / 4 slices of loaf bread (17g each)/ 1-1 ½ cup diced cooked root crops (e.g. <i>kamote</i> , <i>ube</i> , <i>gabi</i>)
Thailand	8-12 rice-serving spoons/day	½ cup of cooked rice (60g) / 1 slice of bread / 1 piece of fermented noodle / 1 ear of corn /
Vietnam	12-15 servings/day (Based on 20g carbohydrate per serving)	Half a bowl of cooked rice (55g) / 1 slice of bread (37g) / 1 potato (95g). One serving of grains contains 20g of carbohydrate

units, such as carbohydrate content and household measures (e.g. rice-serving spoons, tablespoons, cup), used in the definition of what constitutes a serving of the staple food. Using rice as an example, one serving is defined differently across countries: one scoop of rice (75–120g) in Brunei Darussalam, $\frac{3}{4}$ cup of cooked rice in Indonesia, two rice scoops of cooked rice in Malaysia, one cup of boiled rice in the Philippines, $\frac{1}{2}$ cup of cooked rice (60g) in Thailand and half a bowl of cooked rice (55g) in Vietnam (Table 3).

A key common emphasis in the FBDGs of these countries is on choosing whole grains, either mentioned in the key message or through supporting recommendations. Brunei Darussalam and Malaysia recommend that at least half of the grain intake come from whole grain sources. Thailand uses the terms ‘brown rice’ and ‘whole grains’ in its key message. The Philippine guidelines promote whole grains over processed grain products and position them as the preferred energy-providing food in its food plate model. The supporting text of Indonesia’s PGS encourages the consumption of whole grains such as brown rice, corn, and unpolished grains. In terms of the scientific rationale for recommendations, cereals and grains are recognised as primary energy sources, in which adequate consumption contributes to satiety and nutrient adequacy, with whole grains providing essential vitamins, minerals, dietary fibre, and phytochemicals that offer protective benefits against NCDs.

Fruits and vegetables

All six countries consistently promote daily consumption of fruits and vegetables, although the phrasing of their key message differs. Brunei Darussalam specifies quantitative guidance in the key message (“eat at least two servings of fruit and three servings of vegetables every day”), while other countries use qualitative phrases such as “eat plenty/more/sufficient”. Key messages by Thailand and Vietnam specifically mention “colourful vegetables and fruits”, while the Philippines highlights their roles with the message “to get the essential vitamins, minerals and fibre for regulation of body process”. The Philippine guidelines also include practical advice on vegetable preparation, cooking and gardening to support sustainable dietary practices.

Most countries recommend at least three servings of vegetables and two servings of fruits daily, while Thailand and Vietnam recommend a higher fruit intake of at least three servings/day. Scientifically, across all guidelines, fruits and vegetables are recognised as key sources of vitamins, minerals, dietary fibre and antioxidants that help protect against NCDs. The Philippines also emphasises the roles of fruits and vegetables in addressing nutritional gaps of micronutrient deficiencies among Filipinos.

Fish, meat, poultry, eggs, legumes and nuts

All six countries include a key message on consuming protein-rich foods. Brunei Darussalam, Malaysia, the Philippines, Thailand and Vietnam use similar terms, explicitly list food sources in the key message, such as “eat/consume fish, meat/lean meat, poultry, eggs, legumes, nuts”; while Indonesia uses a broader message encouraging consumption of foods that are “high in protein”. Common qualitative wordings are in the key messages of Brunei Darussalam and Malaysia, i.e. “eat in moderation/consume moderate amount”.

The scientific rationale across these FBDGs highlights the importance of these

foods as sources of protein, B vitamins, iron and zinc essential for growth, immune functions and deficiency prevention. While recognising their importance, most guidelines (Brunei Darussalam, Indonesia, Malaysia and the Philippines) caution against excessive intake of red and processed meats due to associated health risks. All countries highlight the importance of achieving a balance by consuming both animal- and plant-based protein sources. Legumes are recognised as an affordable and sustainable alternative that are lower in fat and rich in beneficial phytochemicals. While Indonesia does not explicitly mention legumes or nuts in its key message, supporting notes in the guidelines highlight their health benefits in lowering cholesterol and improving insulin sensitivity.

The recommended intake for this food group varies widely across countries. Brunei Darussalam recommends 2-3 servings of fish, poultry, lean meat daily, no more than 1 egg daily, 3 heaped tablespoons of cooked legumes and 30g serving of non-fried nuts daily and limit red meat to no more than two servings per week. Malaysia recommends one serving of fish daily, 1-2 servings of poultry/eggs/meat daily, and one serving of legumes daily. The Philippines suggests 3-4 servings of fish, shellfish, meat, poultry, dry beans and nuts daily and one egg per day. Other countries provide a range that covers all protein-rich foods: 2-4 portions daily (Indonesia), 6-12 spoons daily (Thailand) and 5-6 servings daily (Vietnam).

Milk and milk products

Only three of the six countries include a specific key message promoting milk and milk products consumption. Malaysia uses a qualitative message, i.e. 'consume adequate amounts of milk and milk products', with supporting recommendations emphasising daily consumption and substitution of sweetened condensed milk/filled milk and sweetened creamer with plain milk options in beverages and cooking. The Philippines' and Thailand's key messages promote other calcium-rich foods alongside milk and milk products. Although there is no specific message on dairy in Brunei Darussalam's and Indonesia's dietary guidelines, recommendations for this food group are embedded within messages on dietary variety and protein intake, respectively.

The shared scientific basis for the recommendation is that milk and milk products provide calcium and protein essential for bones and dental health, as well as other important nutrients. Including these foods in the diet also helps meet calcium requirements more easily due to a higher amount of absorbable calcium per serving. All countries except Indonesia establish quantitative recommendations for milk and dairy consumption. Brunei Darussalam and Malaysia recommend consuming 2-3 and 2 servings/day, respectively. The Philippines recommends one glass/day; Thailand recommends 1-2 glasses/day. Vietnam appears to recommend a higher intake of 3-4 servings daily, using a smaller serving definition, e.g. 100ml of fresh milk, 100g of yoghurt or 15g of cheese. Indonesia's dietary guidelines do not provide a specific recommended intake amount for milk and milk products, as these are grouped with other protein-rich foods.

Water

Water is essential for vital metabolic processes, and its requirements must be met through fluid intake, as the human body cannot produce water to meet its needs. Inadequate hydration can lead to physiological and psychological disorders. Based on these scientific rationales, four of the six countries include a specific

key message on water intake.

Indonesia, Thailand and Vietnam promote adequate consumption of safe or clean water, with Indonesia specifying 'plain water' and Thailand advising 'avoid sweetened beverages' in the key message. Malaysia provides a straightforward message to 'drink plenty of water daily'. Although Brunei Darussalam and the Philippines do not have standalone water messages, both include quantitative water intake guidance in their pictorial food guides. Overall, recommended water intake is similar across countries. Brunei Darussalam, Indonesia and the Philippines recommend eight glasses daily, Malaysia suggests 6-8 glasses daily, and Vietnam recommends a higher intake of 8-12 cups daily.

Messages on foods and food components to limit

Salt

All six countries advise limiting salt intake with a specific key message. Brunei Darussalam and Malaysia emphasise reducing salt during cooking and choosing low-sodium foods, using phrases such as "reduce salt and sauces in cooking and preparations and choose foods with less salt" (Brunei Darussalam) and "choose and prepare foods with less salt, sauces and flavour enhancers (Malaysia)", Indonesia and Thailand combine salt, sugar and fat in a single key message with similar wordings such as "limit intake of foods high in sugar, salt and fat" (Indonesia) and "Avoid food rich in saturated fat, sugar, and salt" (Thailand). Vietnam suggests limiting consumption of "foods high in salt". The Philippines provides more comprehensive guidance through two messages: one on limiting intake of salty, fried, fatty and sugar-rich foods, and another promoting the use of iodised salt to prevent iodine deficiency. Quantitatively, Indonesia specifically lists out that salt intake should be limited to 1 teaspoon/day, while Vietnam suggests less than 5g/day.

The scientific rationale across all guidelines is consistent, linking excessive salt consumption to increased risk of high blood pressure, stroke, cardiovascular diseases, and certain cancers. Malaysia and the Philippines specifically reference the high national prevalence of hypertension and highlight population-level salt reduction as an important public health measure. The Philippines also emphasises the need for iodised salt to address widespread iodine deficiency in the country.

Fats and oil

Similar wordings such as "limit/reduce/avoid intake of fatty foods/ food rich in saturated fat /fried foods" are used in the FBDGs of these countries. Indonesia, the Philippines, Thailand and Vietnam combine messages on limiting fats and oils with foods high in sugar and salt. In terms of scientific rationale, there is general agreement that excessive fat intake contributes to overweight and obesity, which are major risk factors for chronic diseases. Brunei Darussalam, Malaysia and the Philippines also take into consideration the high prevalence of dyslipidaemia and/ or hypercholesterolaemia in their populations. Four of the six countries provide quantitative intake recommendations for fats and oils. Indonesia suggests limiting oil intake to 5 tablespoons/day, while Malaysia and the Philippines recommend a similar range of 6-9 teaspoons/day and 6-8 teaspoons/day, respectively. Vietnam suggests a fat intake of 5-6 servings/day, with 1 serving equalling 5g oils, 5g animal fats, 6g butter, 8g peanuts or 8g sesame seeds.

While most countries (Brunei Darussalam, Indonesia, Malaysia and the Philippines) discuss the roles and sources of different types of fatty acids in the supporting text, only Brunei Darussalam and Malaysia specify the types of fats to consume and limit within their key messages or recommendations. Brunei Darussalam's key message states "use cooking oil sparingly", with supporting recommendations encouraging the replacement of saturated and trans fats with foods rich in polyunsaturated (PUFA) and monounsaturated (MUFA) fats. The Malaysian Dietary Guidelines advise to 'limit saturated fat intake' in the key message and provide detailed supporting recommendations, including increasing intake of omega-6 PUFA-rich oils (e.g. corn oil, soya bean oil, sunflower oil) and omega-3 PUFA-rich foods (e.g. sea bass, torpedo scad, mackerel, nuts, and seeds), reducing intake of foods high in saturated fats (such as butter, fatty meat, full cream milk, coconut milk, and coconut oil), limiting trans-fatty acids intake and using nutritional information to avoid products with "partially hydrogenated fats/oils" or "shortening" in ingredient lists.

Sugar

Key messages on sugar intake are consistent across countries, with all six using similar qualitative phrases such as "limit/avoid/reduce intake of food high in sugar/sugar-rich foods/sugary foods and beverages/drinks". Brunei Darussalam, Malaysia, and Vietnam specifically highlight reducing sugary drink consumption. The Malaysian Dietary Guidelines also include guidance on the use of artificial sweeteners in moderation and caution against relying on them as a primary strategy for managing obesity or diabetes. In terms of quantitative recommendations, Indonesia recommends limiting sugar to 4 tablespoons/day, Malaysia suggests 3-6 teaspoons/day, while Vietnam recommends less than 5 servings/day (1 serving equalling 5g sugar, 8g peanut candy or 6g honey). The Philippines defined naturally occurring and added sugars, and mentioned that both can be part of a balanced diet that includes a variety of foods, the latter however to be consumed only in moderation. The Philippine FBDG provides tips to cut back on added sugars.

The scientific rationale for these recommendations consistently links excessive sugar intake to weight gain, obesity, and increased risks of type 2 diabetes and cardiovascular disease. Brunei Darussalam and the Philippines additionally note that high sugar consumption may displace more nutrient-dense foods from the diet.

Other food/beverage items to limit

Although not addressed through standalone key messages, the majority of these dietary guidelines emphasise limiting processed foods in their supporting notes. Brunei Darussalam advises choosing fresh and unprocessed foods under the key message related to salt intake. Malaysia highlights limiting ultra-processed foods across the supporting notes for multiple key messages. The Philippines recommends reducing preserved and processed foods high in salt (e.g. cheese, canned soups, canned meat, instant noodles) or fat (e.g. luncheon meats, corned beef, sausage, bacon) under the key message on limiting salty, fried, fatty and sugar-rich foods, while Vietnam suggests limiting fast food consumption.

The dietary guidelines of the Philippines, Thailand and Vietnam also recommend limiting or avoiding alcoholic beverages. Alcohol-related messages

are not included in the dietary guidelines of Brunei Darussalam, Indonesia or Malaysia. However, the Malaysian Dietary Guidelines note in the supporting text under water consumption key message that alcoholic beverages should not be used to quench thirst or for rehydration due to their diuretic effects.

Healthy lifestyle-related recommendations

Healthy body weight and physical activity

Achieving a healthy body weight and engaging in regular physical activity are presented as essential components of overall well-being in all six national FBDGs. Similar wordings are used for key messages on healthy body weight, such as “maintain/attain/achieve and maintain normal body weight/proper weight; keep body weight in a healthy range; maintain and control your weight at the recommended level”. Common phrasing for physical activity component include “regular physical activity, do adequate physical activities, moderate physical activity, increase physical activity”. Brunei Darussalam, Indonesia and Vietnam combine physical activity and healthy body weight into a single key message, while Malaysia provides two separate messages for healthy body weight (“Achieve and maintain a healthy body weight”) and physical activity (“Be physically active every day”) and includes a physical activity pyramid. Thailand’s key message on maintaining proper weight is integrated with the message on dietary variety. Similar to Malaysia, the Philippines presents healthy body weight and physical activity across two key messages: one focuses on achieving normal body weight through proper diet and physical activity, while the other one combines physical activity with broader healthy lifestyle advice to prevent lifestyle-related NCDs.

In terms of quantitative recommendations on physical activity, Indonesia and Vietnam suggest at least 30 minutes of physical activity every day. Malaysia’s physical activity pyramid recommends accumulating at least 30-60 minutes of moderate or 15-30 minutes of vigorous aerobic activity, or a combination of both, for 5-7 days per week; incorporating muscle-strengthening activities 2-3 days per week and limiting sedentary behaviours. Other countries generally reference physical activity goals aligned with WHO recommendations without specifying quantitative recommendations in their FBDGs.

The scientific rationales provided are consistent across countries, citing that a healthy weight reduces the risk of overweight, obesity, and related chronic diseases, while regular physical activity supports weight control, improves fitness and mental health, and reduces NCD risk. Brunei Darussalam, Malaysia and the Philippines also cite the high and increasing prevalence of overweight and obesity among both adults and children in their countries.

Food safety

All countries except Indonesia include a key message on food safety, using similar phrases such as “consume clean and safe foods and beverages”. Thailand uniquely highlights “freshly prepared meals”, while Vietnam focuses on a broader safe food handling process with the phrase “ensure safety in food selection, processing and storage”. Although Indonesia does not include a standalone food safety message, prevention of foodborne illness is addressed through its key message on personal hygiene. Across countries, contaminated food and water are recognised as significant public health risks, and proper food choice, preparation, storage,

and cooking are emphasised as preventive measures against food-borne illnesses.

Food and nutrition labels

Four of the six countries, namely Brunei Darussalam, Indonesia, Malaysia and Vietnam, include a key message encouraging the public to read food and nutrition labels. The shared rationale is that information on food labels supports informed food choices when purchasing or planning meals. In their supporting recommendations, Brunei, Indonesia and Malaysia provide practical tips such as checking nutrition information panels, ingredient lists, and comparing nutrient content of similar products. Brunei Darussalam's dietary guidelines also encourage choosing products with Healthier Choice Logos, including examples of healthier choice logos from other countries. Malaysia, on the other hand, provides additional guidance on making use of nutrition claims and front-of-pack labelling, and encourages families to educate children on using nutrition information on food labels.

Additional/Unique lifestyle recommendations

Several countries include unique lifestyle-related key messages, such as home cooking, healthier dining out, breakfast consumption and personal hygiene. Malaysia promotes regular home cooking and healthier dining out through the key message "Cook nutritious foods at home more often and choose healthier options when eating out". The supporting recommendations encourage making home cooking a daily habit, bringing home-cooked meals to workplaces and educational institutions, and choosing healthier options when eating out through practices such as choosing foods cooked with healthier methods, requesting plain water or unsweetened drinks, and limiting high-sodium condiments. Indonesia and Vietnam include a key message advocating regular breakfast consumption to address the common habit of skipping breakfast in both populations. Vietnam also addresses lunch, dinner and cautions against overeating. Indonesia's dietary guidelines also feature a dedicated key message on personal hygiene, recommending regular handwashing with soap and clean running water to ensure overall cleanliness, food safety, and prevent illness.

Key messages for specific population groups

The FBDGs of Brunei Darussalam, the Philippines, and Vietnam include a key message on promoting breastfeeding. These FBDGs consistently advocate exclusive breastfeeding for the first six months, continued breastfeeding up to two years or beyond and timely introduction of appropriate complementary foods from six months of age. Vietnam also includes a comprehensive key message for pregnant women that integrates diet and the use of supplements.

Other countries (Indonesia, Malaysia and Thailand) address breastfeeding and the nutritional needs of pregnant and lactating women in dedicated sections within their guidelines or through separate population-specific dietary guidelines. For example, Indonesia FBDGs address these groups in dedicated chapters outlining balanced nutrition principles for various physiological groups. Malaysia has dietary guidelines for children and adolescents (NCCFN, 2023a), as well as specific dietary guidelines for pregnant and lactating women (NCCFN, 2023b). The Philippines NGF includes a section on special nutrition concerns for pregnant and lactating women, under the key message on "eat a variety of foods", with detailed

food recommendations, as well as for the different life stage groups (i.e., the growing child, school age years, adolescents, adults, and older persons). On the other hand, Thailand has established separate qualitative guidelines for pregnant and lactating women. The guidelines comprise nine key messages distinct from those for the general population, with emphasis on appropriate gestational weight gain and avoidance of alcohol and fermented foods.

Pictorial guides for daily food choices and meals

The six countries commonly use pictorial food guides to communicate and enhance public comprehension of dietary recommendations. Generally, there are two main types of pictorial guides in these dietary guidelines. The first is a pictorial food guide for daily food choice and consumption, commonly presented as upright pyramids or a similar structure. The second is a pictorial guide in the form of a plate to serve as a guide for a meal.

Pictorial guides for daily food choice and consumption

The pictorial guides for daily food choice across the six countries (Figure 1) are commonly presented as upright pyramids (Malaysia, Philippines, Vietnam), or a similar structure, such as the cone-shaped structure *Tumpeng Gizi Seimbang* (TGS) used by Indonesia and the inverted triangular flags by Thailand, while Brunei Darussalam adopts a round plate-shaped format. Summary information in these various pictorial guides are given in Table 4.

Brunei's round plate-shaped pictorial food guide is divided into five segments, representing the proportion of foods from each food group to be consumed throughout the day. The largest segment is allocated to the fruits and vegetables group, followed by the grains group; fish, poultry, lean meat, legumes, nuts group, milk and dairy product group, and finally cooking oils as the smallest segment. A glass of water is illustrated to encourage plain water consumption, while images of energy-dense foods, sugary drinks and salty foods are placed at the bottom with messages advising reduced intake. Recommended servings are specified for fruits and vegetables, while other groups use qualitative guidance such as "eat in moderation", "use sparingly", "enjoy a variety" and "drink plenty".

Indonesia's TGS resembles a ceremonial cone-shaped rice dish with four layers that decrease in size from bottom to top: cereals and root crops at the base; vegetables and fruits in the second layer, animal-source foods and legumes in the third layer; and fats, oils, sugar, and salt at the top. Foods placed at the bottom are intended for higher consumption, while foods in the higher, smaller sections are to be consumed less or sparingly. Its base tray is adorned with symbols representing handwashing, physical activity, and weight monitoring, conveying healthy lifestyle messages related to maintaining cleanliness to ensure food safety, regular exercises and monitoring one's weight to achieve an ideal weight.

Malaysia's pictorial guide for daily food choice is a three-dimensional pyramid with four levels, with foods positioned at the lower, bigger segment recommended for higher consumption. Vegetables and fruits form the base, followed by rice, other cereals, wholegrain cereal-based products and tubers. The third level depicts protein sources, which are further categorised into the fish, poultry, meal and egg group; legumes group; and milk and milk products. Fats, oils, sugars and oils are placed at the top level. Recommended daily servings for each food group are indicated alongside the pyramid, and a glass of water is included to illustrate

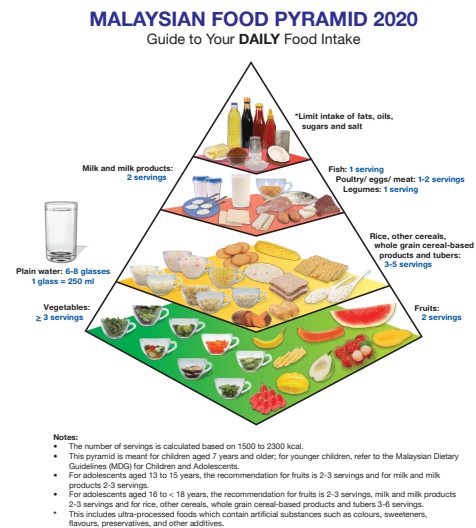
(A) For daily food choices and consumption



Brunei Darussalam



Indonesia



Malaysia

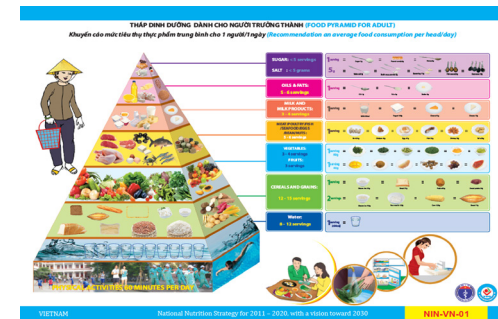
Figure 1. Pictorial food guide in FBDGs of six Southeast Asian countries



The Philippines



Thailand



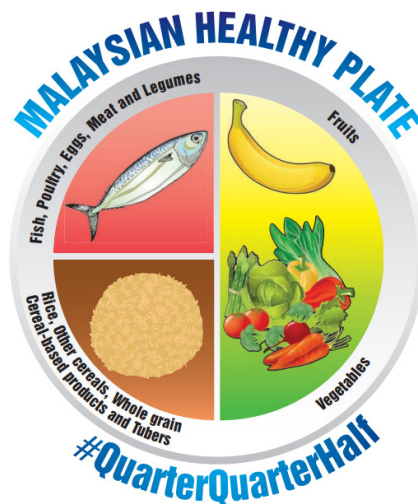
Vietnam

Figure 1. Pictorial food guide in FBDGs of six Southeast Asian countries (continued)

(B) For meals



Indonesia



Malaysia



The Philippines

Figure 1. Pictorial food guide in FBDGs of six Southeast Asian countries (continued)

Table 4. Format of pictorial food guide for daily food choices, quantitative recommendations and other messages in the pictorial food guides of six Southeast Asian countries

	<i>Brunei Darussalam</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Vietnam</i>
Name of pictorial guide	National Healthy Food Plate 2020	<i>Tumpeng Gizi Seimbang</i>	Malaysian Food Pyramid 2020	Daily Nutritional Guide Pyramid for Filipino Adults (20-39 years old)	Nutrition Flag Healthy Eating for Thais	Food Pyramid for Adults
Format	Round plate shape	<i>Tumpeng</i> , cone-shaped	Pyramid	Individual pyramid based on different age groups	Flag, inverted pyramid shape	Pyramid
No. of levels	Plate is divided into 5 segments, showing the appropriate proportions of each food group recommended for one day	5	4	6	4	8
Cereals & products, tubers	6-8 servings/day [†]	3-4 portions/ day	3-5 servings/day	5-8 servings/ day	8-12 rice-serving spoons [‡] /day	12-15 servings/day
Vegetables	At least 3 servings/day	3-4 portions/day	≥3 servings/day	3 servings/day	4-6 rice-serving spoons [‡] /day	3-4 servings/day
Fruits	At least 2 servings/day	2-3 portions/day	2 servings/day	2-3 servings/day	3-5 portions/day	3 servings/day
Milk & milk products	2-3 servings/day [†]	NA	2 servings/day	1 glass/day	1-2 glass(es)/day	3-4 servings/day
Fish, poultry, meat, eggs, legumes	2-3 servings/day [†]	2-4 portions/day	Fish: 1 serving/day Poultry/eggs/meat: 1-2 servings/day Legumes: 1 serving/day	Fish, shellfish, meat & poultry, dried beans & nuts: 3-4 servings/day; Egg: 1 piece/ day	6-12 spoons/day	5-6 servings/day
Fat, oil, sugar, salt	Reduce intake; Salt: less than 1 teaspoon/day [†] ; Fats/oils: Use recommended cooking oil sparingly	Limit intake Sugar: 4 tablespoons/day Salt: 1 teaspoon/day Oil: 5 tablespoons/day	Limit intake of fats, oils, sugars and salt sugar: 3-6 teaspoons/day [†] fats/oils: 6-9 teaspoons/day [†]	Sugar/sweets: 5-8 teaspoons/day Fats & oils: 6-8 teaspoons/day	Eat only in limited amounts	Sugar: <5 servings/day Salt: <5g/day Fat: 5-6 servings/day

(To be continued)

Table 4. Format of pictorial food guide for daily food choices, quantitative recommendations and other messages in the pictorial food guides of six Southeast Asian countries (*continued*)

	<i>Brunei Darussalam</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Vietnam</i>
Other dietary and lifestyle messages	• Image of a glass of water by side of plate, and message to drink plenty of water • Reduce intake of energy-dense foods, sugary drinks and salty foods, images of these foods placed at lower right side of the plate	Other images placed surrounding the <i>tumpeng</i>: • Drink 8 glasses of plain water • Practise hand washing • Monitor body weight • Five types of physical activity images (playing football, walking, exercising, doing housework, integrated exercise) to encourage engage in regular physical activity and sports	A glass of water by side of pyramid and notes to drink 6-8 glasses of plain water daily	• Message on drinking 8 glasses of water daily, placed at second lowest level of the pyramid • Message on exercise and personal & environmental hygiene at the lowest level of the pyramid: ◦ Do regular exercise in most days of the week for at least 30 minutes ◦ Practise good personal and environmental hygiene • Footnote at base of pyramid on eating plan for healthy living: ◦ Eat a variety of foods everyday to ensure that all nutrients are provided in proper amount and balance ◦ Use iodised salt and eat other fortified foods to increase the intake of micronutrients	Footnote at base of nutrition flag: For good health, eat a variety of food in appropriate amounts	• Images of 10 glasses of water at the second lowest level of the food pyramid • Message on physical activities 60 minutes per day at the base of the pyramid • A table is provided next to the food pyramid giving examples of serving sizes of various food groups in each level of the pyramid • Images next to food pyramid: eating a variety of foods, wash vegetables well, proper food storage and hand washing

(To be continued)

Table 4. Format of pictorial food guide for daily food choices, quantitative recommendations and other messages in the pictorial food guides of six Southeast Asian countries (*continued*)

<i>Brunei Darussalam</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Vietnam</i>
Other associated notes		Footnotes to explain number of servings and use of pyramid: • The number of servings is calculated based on 1500 to 2300 kcal. • This pyramid is meant for children aged 7 years and older; for younger children, refer to the Malaysian Dietary Guidelines (MDG) for Children and Adolescents. • For adolescents aged 13 to 15 years, the recommendation for fruits is 2-3 servings and for milk and milk products 2-3 servings. • For adolescents aged 16 to < 18 years, the recommendation for fruits is 2-3 servings, milk and milk products, 2-3 servings and for rice, other cereals, whole grain cereal-based products and tubers 3-6 servings. • Footnote for fats/oil, sugar and salt at tip of pyramid: ○ This includes ultra-processed foods which contain artificial substances such as colours, sweeteners, flavours, preservatives, and other additives.			

NA: No related message in the dietary guidelines;

† Quantitative recommendations not mentioned in the pictorial food guide but provided in the explanatory notes for the pictorial food guide;

‡ 1 rice-serving spoon = ½ cup

recommended hydration.

The Daily Nutritional Guide (DNG) Pyramid for Filipinos consists of six levels, with the lowest level slightly separated from the rest of the pyramid, highlighting physical activity as an essential component of healthy living. Water is included at the second level from the bottom. Above this, cereals and root crops form the third level and are recommended for liberal consumption to meet the energy needs, followed by vegetables and fruits at the fourth level, recommended to be eaten more. Animal-based protein foods, including fish, meat, poultry, seafood, milk, dairy, and protein-based foods such as dried beans and nuts, are placed at the fifth level, recommended for moderate consumption. Fats, oils and sugar are positioned at the top for limited intake. Recommended amounts for each food group are shown alongside the pyramid.

Thailand's pictorial guide for daily food choice is presented as an inverted triangular "Nutrition Flag". The widest layer at the top of the flag represents grains and other starchy foods, which are recommended for the highest consumption. Moving down, the second layer is divided into a larger vegetable group and a smaller fruit group, both recommended for plentiful consumption. The third layer includes a larger group of meat, legumes, and eggs and a smaller milk group for moderate intake. The tip of the flag displays oil, sugar, and salt, which are to be consumed sparingly. Recommended amounts are shown using household serving units.

Vietnam's nutritional pyramid for adults illustrates recommended daily average food consumption per capita (NIN, 2021). It consists of eight levels, with physical activity at the base and water at the second level. Consistent with the food pyramid principle, foods positioned at the base are to be consumed more. Staple cereals and grains form the base after water for the highest consumption, followed by the fruits and vegetables group; protein-rich foods (including poultry, meat, seafoods, eggs and legumes); milk and dairy group; fats and oils groups; and finally sugar and salt at the top. The pyramid also includes recommended daily servings for each group and visual examples of one serving to guide the public on quantity and variety for a balanced diet.

Pictorial guides for daily meals

Indonesia, Malaysia and the Philippines have also developed visual guides to complement their food pyramids to assist in planning daily meals, commonly presented in a plate format. These food plates guide the appropriate proportions of major food groups to be consumed at each meal (Table 5).

Indonesia's My Plate (*Isi Piringku*) is divided into two halves, comprising four portions. One-half of the plate depicts two-thirds staple foods (cereals and root crops) and one-third protein sources (a combination of animal- and plant-based protein foods). The other half contains two-thirds vegetables and one-third fruits (MOH Indonesia, 2018). This visual guide also emphasises handwashing, daily physical activity of at least 30 minutes, adequate hydration, weight control and limiting sugar, salt and oil intake (Ridhani et al., 2021).

The Malaysian Healthy Plate (*Pinggan Sihat Malaysia*) is divided according to the quarter-quarter-half concept for each meal: one quarter of the plate for protein-rich foods (such as fish, poultry, meat, eggs, legumes and dairy products), one quarter for rice, other cereals, whole grains and wholegrain cereal-based products, and half of the plate for vegetables and fruits.

Table 5. Food plate pictorial guide for meals in FBDGs of three Southeast Asian countries

	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>
Name of plate	<i>Isi Piringku: Sajian Sekali Makan</i> (My Meal Plate Content: servings per meal)	Malaysian Healthy Plate	<i>Pinggang Pinoy</i> (Healthy Food Plate for Filipino Adults)
Guidance to daily/per meal food intake	Plate is divided into 4 segments, showing the appropriate proportions of each food group recommended for a meal	Plate is divided into 4 segments, showing the appropriate proportions of each food group recommended for a meal based on the quarter-quarter-half concept	Plate is divided into 4 segments, showing the appropriate proportions of each food group recommended for a meal
Cereals & products, tubers	1/3 of the plate, labelled as staple food	1/4 of the plate, labelled as rice, noodles, bread, cereals, cereal products & tubers	1/3 of the plate, labelled as “Go” foods (energy giving foods)
Vegetables & fruits	1/6 of the plate, labelled as fruits 1/3 of the plate, labelled as vegetables	1/2 of the plate, labelled as fruits and vegetables	1/3 of the plate (vegetables) and 1/6 (fruits) of the plate. These two segments labelled as “Glow” foods (body regulating foods)
Milk & milk products	Not depicted in the plate	Not depicted in the plate	Not depicted in the plate
Fish, poultry, meat, eggs, legumes	1/6 of the plate, labelled as side dishes	1/4 of the plate, labelled as fish, poultry, meat and legumes	1/6 of the plate, labelled as “Grow” foods (body building foods)
Fats and oil	Not on the plate	Not on the plate	Not on the plate
Additional messages	Five notes are placed below the plate: • Wash hand with soap • Do 30 minutes of physical activity/day • Drink 8 glasses of water/day • Monitor body weight • Limit sugar (4 tablespoons), salt (1 teaspoon) and fat/oil (5 tablespoons)		Image of a glass of plain water to encourage drinking of water every day for adequate hydration

The Philippines developed A Healthy Food Plate for a Well-Nourished Nation (*Pinggang Pinoy*) for various age groups. The *Pinggang Pinoy* illustrates four segments, with larger equal portions for cereals and vegetables, smaller equal portions for protein sources and fruits, and an accompanying glass of water. The plate incorporates the widely recognised Filipino food classification slogan, the “Go”, “Grow” and “Glow” foods, at the periphery of the plate to reinforce dietary recommendation messages.

DISCUSSION

Similarities and differences of key attributes

Examining the 20 key messages identified from the FBDGs of six SEA countries reveals a high level of consistency across countries regionally on several dietary recommendations. The following topics are present in the guidelines of all countries: consuming a diverse and well-balanced diet with a wide array of foods from various food groups; eating abundant vegetables and fruits; prioritising minimally processed starchy staples, grains or whole grains; moderating consumption of protein-rich foods while including both animal and plant-based sources; limiting intake of foods high in fats and oils, sugar and salt; engaging in regular physical activity and maintaining a normal/healthy body weight. Most countries, including Brunei Darussalam, Indonesia, Malaysia and the Philippines, supplement their key messages with more detailed guidance on how recommendations can be achieved.

While the countries employ diverse and culturally inspired pictorial food guides for daily food choices, they have share common principles and attributes. These pictorial food guides consistently present core concepts of a healthy diet, which are balance, proportionality and variety. Most pictorial guides display four to six levels depicting all food groups, with food groups placed in the larger sections intended for higher consumption, and those in the upper/lower smaller sections are to be consumed less. A variety of nutritionally similar foods are also shown within the same level, encouraging variety consumption.

Food groupings are largely similar across the countries, with minor differences in how milk and dairy products are categorised (i.e. Indonesia groups milk and dairy products with other protein-rich foods, whereas other countries present them as a separate group). Carbohydrate-rich foods form the largest layer in all countries’ pictorial guides for daily food choices, except Malaysia, which places vegetables and fruits at the base, recommended to be consumed most, to contribute towards addressing the rising prevalence of NCDs. Legumes and their products are positioned as alternatives to meat products in all countries, recommended for moderate consumption. Fats/oils, sugar, and salt consistently constitute the smallest layer at the tip of all visual food guides, reflecting the need for minimal consumption due to their associations with diet-related chronic diseases. The pictorial food plate for daily meals also consistently promote balanced diet and shared similar concept of recommending approximately a quarter plate of carbohydrate foods, a quarter plate of meat/fish/protein foods and a half plate of vegetables and fruits per meal.

The scientific basis cited for the FBDG key messages is highly consistent among the countries. Most countries indicated adopting an evidence-based approach for establishing the recommendations, considering current scientific knowledge

and their national nutrition landscape. Similarities in key messages may largely stem from common socio-economic background, development status, as well as nutrition transition, which have shifted the region's traditional diet abundant in grains, legumes, vegetables and fruits to diets higher in refined carbohydrates, fats, and sugars, leading to increased burden of diet-related diseases. Many countries also draw on international guidance from the WHO and FAO and reference each other's dietary guidelines. For example, the Malaysian Dietary Guidelines were cited in Brunei Darussalam's FBDGs.

On the other hand, country-specific priorities are also reflected in some of their unique key messages. Examples include promoting regular breakfast in Indonesia to address low breakfast consumption, encouraging home cooking and healthier dining-out options in Malaysia in response to increased prevalence of eating out, and advocating the use of iodised salt in the Philippines to prevent iodine deficiency.

Promotion and dissemination of FBDG messages in SEA countries and challenges

FBDGs messages need to be effectively communicated to ensure broad public awareness and adoption. Countries have taken multiple strategies for promoting and disseminating their FBDGs. Malaysia, the Philippines, Thailand and Vietnam have leveraged community-based educational campaigns and mass media channels such as television, radio, official websites, e-billboards, and social media to reach diverse audiences. These initiatives are supported by a wide range of digital and printed materials, including posters, leaflets, booklets, magnet reminders, food models, videos and songs to help translate guidelines into practical habits.

Countries also indicate coordinating multi-stakeholder efforts involving different ministries, non-governmental organisations and educators to integrate FBDGs into policies and programmes such as school curricula, school meal programmes, agricultural initiatives, maternal and child health programmes and social protection programmes (SEA-PHN Network, 2022a; SEA-PHN Network, 2024). In Malaysia, the Malaysian Food Pyramid 2020 is also used as one of the main references in the review of the Food Poverty Line Index. In addition, FBDG messages are incorporated into undergraduate and postgraduate nutrition courses at public and private universities (Khairul Zarina, 2022). In Vietnam, health communication campaigns and workshops were held for healthcare professionals and press collaborators to enhance dissemination skills (Phuong, 2022).

Despite these efforts, challenges persist, with the most common challenges cited being a lack of strong communication, collaboration and commitment among multi-sectoral stakeholders, a weak monitoring and evaluation system and insufficient community reach (SEA-PHN Network, 2022a; SEA-PHN Network, 2024). Even when the public is aware of the guidelines, they often struggle to implement the recommendations in daily life. An online survey in Malaysia, Philippines and Thailand ($n=1424$) revealed that while over 80% were aware of pictorial food guides specific to their country, only around one-third claimed to 'always' follow the recommendations. The primary barriers include perceived difficulty in applying the guidelines (SEA-PHN Network, 2022b). The broader food environment across the region characterised by the rapidly expanding fast food and food delivery sector, long established street food culture, abundant supplies of processed foods in the market, increasing prevalence of eating out, coupled with

rising food prices, aggressive marketing of unhealthy foods and drinks, and social perceptions that healthy foods are expensive, have pose additional challenges to the adoption of FBDG messages (SEA-PHN Network, 2024). Shortage of trained nutritionists and health staff has also restricted effective FBDG dissemination in Malaysia and Vietnam (Khairul Zarina, 2022; Phuong, 2022).

Recommendations

With ongoing changes of dietary and nutrition landscape and advancements in nutrition science, FBDGs in the region require continual updating in the future. The revision and promotion will require greater attention on effective communication, practical application and public adoption.

It is imperative that the developed FBDGs be widely disseminated to all stakeholders. In this regard, their roles, related strategies and channels for systematic FBDGs dissemination should be clearly outlined in the National Plan of Action for Nutrition. Healthcare professionals, including nutritionists, dietitians, doctors, nurses and health educators in both public and private sectors, are valuable resources for consistent delivery of FBDG dietary messages to the public and should be adequately trained in FBDGs communication. Maintaining dialogue with private sector stakeholders, including the food industry, is important for informing, educating, gathering feedback and collaborating on FBDGs dissemination. Industry should be encouraged to use FBDGs to guide product formulation and improve the nutritional quality of ready-to-eat foods to align with public health goals. Regulatory authorities may consider allowing the inclusion of FBDG messages on the food labels where appropriate, in accordance with Codex guidelines on nutrition and health claims (FAO/WHO, 2013), to avoid misleading health claims for company products.

In addition, the potential role of schools as important platforms for promoting FBDG messages and instilling healthy dietary habits from a young age could be given more attention. Assigning trained nutritionists to schools ensures accurate nutrition messaging and, at the same time, supports nutrition-related activities in schools. In this regard, specially designed tools and modules such as Good Nutrition Key to Healthy Children (GNKCH) have been developed by the SEA-PHN Network based on the FBDGs of the SEA countries and tested across five countries (Hardinsyah, 2023). It is currently being implemented in the Malaysia School Nutrition Promotion Programme (MySNPP), in conjunction with the provision of balanced meals in selected primary schools in Malaysia (Teo *et al.*, 2023).

Understanding public barriers to adopting the FBDGs is also crucial. The public may recognise the importance of consuming diverse, well-balanced meals, but adherence to the recommendations may be constrained by various factors such as food preferences, food preparation, shopping and cooking skills, motivation, socio-economic status and cultural norms. More research is needed to understand whether the messages reach those most in need and their perception, comprehension, uptake and utilisation. Practicality of the messages and challenges, such as the public's ability to estimate portion or serving size as recommended in the dietary guidelines are also worth re-examining. Conflicting messages from social media may further influence adherence. Recommendations that are straightforward and actionable may be easier for people to adhere to.

It is also important to acknowledge that the key determinants affecting the practicality of the FBDGs are the affordability, availability and accessibility of the

recommended foods. Countries in the SEA region are facing continued pressure on food and nutrition security post COVID-19 pandemic (Sundram, 2023; Choiruzzad, 2024), and low socio-economic groups may not have the means to access a diverse diet. More strategies are needed to address nutrition inequalities and ensure a resilient food system for an adequate supply of affordable, nutritious foods. These could include consideration for innovations in farming, incentivising farmers, agriculture research, infrastructure improvements, enhancing seed and crop diversity and productivity, subsidising healthy foods, regulating marketing of unhealthy food and beverages, and integrating nutrition education with food assistance programmes.

There has been considerable emphasis on limiting intake of processed foods and guidance provided through food and nutrition labels in several SEA countries. This is essential as processed foods are an important part of the food environment. However the introduction of the NOVA classification and use of the term ultra-processed foods in dietary guidelines for the general population may confuse consumers. The public has traditionally been informed that nutritional value of foods are best characterised by the nutrients and phytonutrients they contain rather than the degree of processing.

Promotion of healthy eating and creation of supportive healthy food environments in SEA countries should extend beyond processed foods in the market. There has been marked changes in the food environment in countries in the region, characterised by the growing prevalence of eating out in, with wide availability of street and hawker foods, eateries, restaurants, and food delivery services catering to diverse tastes and budgets (Dawe *et al.*, 2019; Phan, O'Leary & Mottiar, 2025). These meals, especially street foods, are often high in fats, sugar and sodium (Haron *et al.*, 2022; Zainal Arifen *et al.*, 2023; Zainal Arifen *et al.*, 2024). (Dawe *et al.*, 2019; Phan *et al.*, 2025).

Despite this, current FBDGs in most of these countries largely lack guidance on making healthier food choices when dining out or ordering through food delivery services. Such related key messages are currently only available in the Malaysian Dietary Guidelines. This gap in guidance is concerning, as populations in the region are likely to rely heavily on away-from-home meals to meet daily energy and nutrient needs (WHO, 2022). Therefore, there is a pressing need for FBDGs in the region to incorporate guidance that empowers the public to make informed choices when dining out in different settings. The food service and catering industry should also be encouraged to use official FBDGs as a guide to improve the nutritional quality of foods served and to make recommended foods more readily available to consumers through recipe reformulation.

In addressing the challenges on lack of multi-stakeholder involvement and consistency in promoting FBDGs, it is vital for national governments to endorse and emphasise the importance of FBDGs to all stakeholders beyond healthcare professionals. The actors who influence the price and availability of different foods, and in turn influence food choices, consumption and dietary habits, such as those in the agriculture sectors, food industry, food distribution, food services, retail industry, caterers, media, consumer organisations, and all stakeholders along the food supply chain, should be engaged to promote FBDGs.

A structured system to monitor and evaluate FBDGs is also essential for subsequent FBDGs update and reformulation. Assessing dissemination helps understand whether messages effectively reach the public and influence

knowledge, attitudes and behaviours. Ideally, effectiveness should be measured through population dietary surveys and epidemiological studies of diet-related health outcomes. However, such studies are often infrequent due to their complexity and cost. Innovation, cost-effective tools are therefore needed for timely data collection to ensure timely intervention implementation. One such tool is the web-based Malaysian Healthy Diet Online Survey (MHDOS) to obtain dietary data more rapidly and measure population compliance with the dietary guidelines recommendations (Wong *et al.*, 2023). This approach demonstrates the potential of web-based methodologies as additional approaches to national consumption surveys in the future.

CONCLUSION

All six countries have long recognised the importance of FBDGs in supporting their population's well-being. Countries have carried out revisions of national FBDGs over the decades. This review of current FBDGs in six SEA countries indicate that there is a high level of regional consistency in key dietary recommendations. Given the similarities in dietary patterns, socio-economic conditions and nutritional challenges across the region, closer collaboration among authorities and researchers could be the way forward to enhance FBDG implementation. This includes data sharing, exchanging approaches and experiences in FBDGs development and dissemination. In this regard, establishing a platform for periodic knowledge, expertise and views exchange would be most beneficial. Future work could expand comparative analysis to include more countries, examine guidelines for specific population groups, and share successful strategies for effective FBDGs dissemination.

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Conflict of interest

The authors declare that they have no conflicts of interest.

Authors' contributions

All authors contributed to the paper and approved the final draft of the manuscript.

References

- Choiruzzad SAB (2024). Status of Food Security in East and Southeast Asia. In: Lee E, Böer B, Surendra L, Chun JA, Taniguchi M (eds). *The Water, Energy, and Food Security Nexus in Asia and the Pacific. Water Security in a New World*. Springer, Cham. https://doi.org/10.1007/978-3-031-12495-2_4
- Dawe D, Briones R, Hassan N, Hermanto, Huang J, Kumar AG, Nguyen LH, Saliem HP, Shaheen N, Truong TTT et al (2019). Trends in food prepared outside the home in some Asian countries. *World Food Policy* 5:16-23. <https://doi.org/10.1002/wfp2.12001>.
- FAO & WHO (2019). *Sustainable Healthy Diets—Guiding Principles*. Food and Agriculture Organization. Italy, Rome.
- FAO (2024) Food System-Based Dietary Guidelines: An Overview. Food and Agriculture Organization of the United Nations. From: <https://openknowledge.fao.org/server/api/core/bitstreams/20b9fd77-47f5-46f0-bdd9-94f798620368/content> [Retrieved August 7 2024].

- FAO/WHO (1998). Preparation and Use of Food-Based Dietary Guidelines: Report of A Joint FAO/WHO Consultation. *World Health Organ Tech Rep Ser* 880:1–108.
- FAO/WHO (2013). Codex Alimentarius Guidelines for Use of Nutrition and Health Claims (CAC/GL 23-1997). From: <https://www.fao.org/ag/humannutrition/32443-04352e8311b857c57caf5ffc4c5c4a4cd.pdf> [Retrieved January 25 2024].
- Florentino RF, Tee ES, Hardinsyah R, Ismail MN & Suthutvoravut U & Hop LT (2016). Food-base dietary guidelines of Southeast Asian countries: Part 2 – Analysis of pictorial food guides. *Mal J Nutr* 22(Supp):S49-S65.
- FNRI-DOST (2015). *Nutritional guidelines for Filipinos Revised 2012*. Food and Nutrition Research Institute-Department of Science and Technology, Philippines, Taguig City.
- Hardinsyah (2023). *School Nutrition Promotion Programme Using the GNKHC Module*. Southeast Asia Public Health Nutrition Network [Conference presentation]. 14th Asian Congress of Nutrition, 14-17 September 2023, Chengdu, China.
- Haron H, Zainal Arifen ZN, Shahar S, Mohamad H, Mohd Yazid SFZ, Michael V, Abeyasinghe R, Taketo T & Trieu K (2022). Street food in Malaysia: What are the sodium levels? *Foods* 11(23):3791. <https://doi.org/10.3390/foods11233791>
- Khairul Zarina MY (2022). *Food based dietary guidelines in Malaysia* [PowerPoint slides presented at SEA-PHN Webinar Series 2/2022 on Promotion and Consumers' Use of Food-Based Dietary Guidelines in Southeast Asia Countries, 22 November 2022]. Nutrition Division, Ministry of Health, Malaysia.
- MOH Brunei Darussalam (2020). *National Dietary guidelines for Healthy Eating Brunei Darussalam: A Scientific Document of the Technical Working Group on the National Dietary Guidelines*. Technical Working Group of the National Dietary Guidelines, Health Promotion Centre, Ministry of Health Brunei Darussalam, Bandar Seri Begawan.
- MOH Indonesia (2014). *Pedoman Gizi Seimbang (PGS)*. (Guide to Balanced Nutrition). Ministry of Health, Republic of Indonesia, Jakarta.
- MOH Indonesia (2018). Isi Piringku. Ministry of Health, Republic of Indonesia. From <https://kesmas.kemkes.go.id/konten/133/0/062511-isi-piringku#:~:text=Secara%20umum%2C%20%22Isi%20Piringku%22,lemak%20dalam%20konsumsi%20 sehari%2Dhari> [Retrieved December 12 2023].
- MOH Vietnam (2024). Draft Decision Issuing “Ten tips on proper nutrition for 2030”. Personal communications.
- MOPH Thailand (2022) In: *Thai food-based dietary guidelines for general population*. Bureau of Nutrition, Department of Health, Ministry of Public Health Thailand. From: <https://nutrition2.anamai.moph.go.th/th/fbdgs> [Retrieved November 29 2023].
- NCCFN (2021). *Malaysian Dietary Guidelines 2020*. National Coordinating Committee on Food and Nutrition, Ministry of Health Malaysia.
- NCCFN (2023a). *Malaysian Dietary Guidelines for Children and Adolescents 2023*. Technical Working Group on Nutritional Guidelines for National Coordinating Committee on Food and Nutrition, Ministry of Health Malaysia.
- NCCFN (2023b). *Maternal Dietary Guidelines for Malaysia 2023*. Technical Working Group on Nutritional Guidelines for National Coordinating Committee on Food and Nutrition, Ministry of Health Malaysia.
- NIN (2021). Poster of reasonable nutrition pyramids for Vietnamese people – English version. National Institute of Nutrition, Vietnam, Hanoi. From: <https://chuyentrang.viendinhduong.vn/FileUpload/Documents/Nam%202021/Cac%20Thap%20DD%20hop%20ly%20cho%20nguai%20VN-phien%20ban%20Tieng%20Anh.pdf> [Retrieved January 22 2024].
- Phan TTL, O'Leary D & Mottiar Z (2025). A review of street food management in Asia. *Annals of Gastronomy and Tourism Studies*, 2(1):26-37. DOI: 10.69527/agats.2025.13
- Phuong NTH (2022). *Promotion and dissemination of FBDGs messages in Vietnam*. National Institute of Nutrition, Vietnam [Webinar presentation]. SEA-PHN Network Webinar Series 2/2022 on Promotion and Consumers' Use of Food-Based Dietary Guidelines in Southeast Asia Countries, 22 November 2022.

- Rachmi CN, Li M & Baur LA (2018). The double burden of malnutrition in Association of South East Asian Nations (ASEAN) countries: a comprehensive review of the literature. *Asia Pac J Clin Nutr*. 27(4):736-755. doi: 10.6133/apjcn.062018.02. PMID: 30045417.
- Ridhani FD, Pritasari & Anggraini DR (2021). Isi Piringku dietary meal proportion estimator applications using seefood image segmentations. *SANITAS: Jurnal Teknologi dan Seni Kesehatan* 12(2):115-130.
- SEA-PHN Network (2022a). *Promotion and Consumers' Use of Food-based Dietary Guidelines (FBDGs) in Southeast Asia Countries*. Webinar Report Series 2/2022. Southeast Asia Public Health Nutrition Network. From https://sea-phn.org/wp-content/uploads/2023/02/SEA-PHN-Network-2022_Report-of-Webinar-2-on-Promotion-and-Consumers-Use-of-FBDGs-in-Southeast-Asia-Countries-final-1.pdf [Retrieved April 19 2024].
- SEA-PHN Network (2022b). *Findings of an online survey on consumer awareness, understanding and use of dietary guidelines in Southeast Asia Countries*. Southeast Asia Public Health Nutrition Network [Webinar presentation]. SEA-PHN Network Webinar Series 2/2022 on Promotion and Consumers' Use of Food-Based Dietary Guidelines in Southeast Asia Countries, 22 November 2022.
- SEA-PHN Network (2024). *Food-Based Dietary Guidelines in Southeast Asia: Status and Impact*. [Conference presentation]. 2nd Southeast Asia Public Health Nutrition Conference, 13 November 2024, Bangkok, Thailand.
- Sundram P (2023) Food security in ASEAN: progress, challenges and future. *Front. Sustain. Food Syst*. 7:1260619. doi: 10.3389/fsufs.2023.1260619
- Tee ES, Florentino R, Hardinsyah, Ismail MN, Hlaing LM, Chotivichien S & Hop LT (2020). A review of national plans of action for nutrition in Southeast Asian countries. *Mal J Nutr* 26(3): 501-524.
- Tee ES, Hardinsyah R, Florentino RF, Ismail MN & Suthutvoravut U & Hop LT (2016). Food-based dietary guidelines of Southeast Asian countries: Part 1 – A compilation and analysis of key message. *Mal J Nutr* 22(Supp):S1-S47.
- Teo CH, Chin YS, Tee ES, Goh HT, Ng S, Shahir S & Hafizan J (2023). *Malaysia School Nutrition Promotion Programme (MySNPP): Diversifying strategies during COVID-19 pandemic* [Conference presentation]. 14th Asian Congress of Nutrition, 14-17 September 2023, Chengdu, China.
- Therakomen V, Chotivichien S, Unkanavin N, Pongcharoen T & Kongpanya P (2023). Revision of food-based dietary guidelines for Thailand: Phase 1 qualitative guidelines. *Clinical Nutrition ESPEN* 58:580-581.
- WHO (2022). Supporting healthy diets: a case study-based framework for healthier out-of-home foods. World Health Organization. Regional Office for South-East Asia. Available from: <https://www.who.int/publications/i/item/9789290229360>
- Wong JE, Woon FC, Chin YS, The WS, Rusidah S, Ahmad Ali Z, Gilly AH & Tee ES (2023). Malaysian Healthy Diet Online Survey (MHDOS): Study rationale and methodology. *Mal J Nutr* 29(2):273-283.
- Zainal Arifen ZN, Shahar S, Trieu K, Abdul Majid H, Md Noh MF & Haron H (2024). Individual and total sugar contents of street foods in Malaysia - Should we be concerned? *Food Chem* 450:139288. doi:10.1016/j.foodchem.2024.139288
- Zainal Arifen ZN, Shahril MR, Shahar S, Mohamad H, Mohd Yazid SFZ, Michael V, Taketo T, Trieu K, Harith S, Ibrahim NH, Abdul Razak S, Mat Jusoh H, Hun Pin C, Lee JS, Mohamed Ismail R, Lai Kuan L & Haron H (2023). Fatty acid composition of selected street foods commonly available in Malaysia. *Foods* 12(6):1234. <https://doi.org/10.3390/foods12061234>