



MALAYSIAN DIETARY GUIDELINES 2020



National Coordinating Committee on Food and Nutrition (NCCFN)

MINISTRY OF HEALTH MALAYSIA



MALAYSIAN DIETARY GUIDELINES 2020

National Coordinating Committee on Food and Nutrition
Ministry of Health Malaysia

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MINISTRY OF HEALTH

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National Coordinating Committee on Food and Nutrition
Ministry of Health Malaysia



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Message by Minister of Health Malaysia

Effective messaging promoting healthy eating is a critical strategy that will allow for prevention, and help control the burden of malnutrition in the country. It is for this reason the Malaysian Dietary Guidelines (MDG) were formulated in 1996 and were revised in both 2010 and 2020 to ensure that all Malaysians have access to reliable and accurate nutritional information. The Malaysian Dietary Guidelines 2020 were thoroughly reviewed, taking into consideration diet-related non-communicable diseases and dietary patterns of Malaysians from all walks of life.

The Malaysian Dietary Guidelines 2020, intended for adults aged 18 to 59 years old, provide key messages to assist healthcare practitioners in guiding Malaysians on healthy eating practices. It is also an essential resource for health professionals, academicians, non-government organisations, and other stakeholders and policymakers to design practical healthy eating recommendations for Malaysians. I hope that these MDGs are beneficial in our effort to curb malnutrition in Malaysia.

I would like to express my heartfelt gratitude and congratulations to the Malaysian Dietary Guidelines 2020 Technical Working Group members and to those who have contributed to the development of the MDGs directly or indirectly.



Khairy Jamaluddin
Minister
Ministry of Health Malaysia

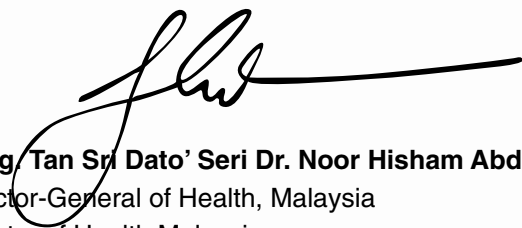


Foreword by Director-General of Health

Diet-related non-communicable diseases are an undeniable consequence of an unhealthy lifestyle. Apart from sedentary or inactive lifestyles, unhealthy dietary practices have further aggravated the problems. The prevalence of these chronic diet-related diseases is increasing at an alarming rate. The non-communicable diseases burden forms a public health risk with a high financial impact and intangible losses due to decreased productivity. Therefore, it is timely for the Ministry of Health Malaysia to strengthen the advocacy of healthy lifestyles, including healthy eating to the population.

The Malaysian Dietary Guidelines were developed at the national level to assist health professionals and other stakeholders in educating the Malaysian population about healthy eating. Since 1999, this document has been reviewed periodically to ensure that it continues to be relevant to the current and future nutritional situation in the country. The Malaysian Dietary Guidelines was moulded on from the latest peer-reviewed scientific evidence to warrant substantiate and effective recommendations, and it will complement other initiatives to cultivate healthy eating practices amongst Malaysian adults.

Therefore, I envisioned the Malaysian Dietary Guidelines 2020 as the main reference in the country for healthy eating practices. Last but not least, I would like to take this opportunity to congratulate and convey my gratitude to those who were involved in the review of the document, particularly the Malaysian Dietary Guidelines Technical Working Group members.



YBhg. Tan Sri Dato' Seri Dr. Noor Hisham Abdullah
Director-General of Health, Malaysia
Ministry of Health Malaysia



Preface by


Deputy Director-General of Health Malaysia (Public Health) Malaysia

Since the past decades, Malaysia has been experiencing nutrition transition and lifestyle changes. These include a change from a traditional to a more 'westernized' or global diet and lifestyle. The National Health and Morbidity Survey (NHMS 2019) showed that about half of the adults population in Malaysia were obese, with 30.4% and 19.7% being overweight and obese, respectively. There was also an increase of other diet related non-communicable diseases such as diabetes and hypercholesterolemia. This situation is aggravated by the Covid-19 pandemic which has imposed a significant economic burden on individuals, families, and nations.

Therefore, the revised Malaysian Dietary Guidelines 2020 focuses on adults which were developed based on the recommended nutrient intake (RNI, 2017), the latest nutritional status and scientific evidence. In the Malaysian Dietary Guidelines 2020, all the 14 key messages, key recommendations and how to achieve were written by a group of nutrition experts to ensure appropriate and meaningful recommendations and achievable to be practiced.

I do hope that these guidelines would be a valuable resource for health care, personnel, academicians, non-government organisations and other stakeholders in disseminating appropriate nutrition messages. Finally, I would like to express my heartfelt gratitude to all those who have been involved in the completion of this Malaysian Dietary Guidelines 2020.

Datuk Dr. Chong Chee Kheong
Deputy Director General Of Health (Public Health)
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Preface by Chairman of Technical Working Group on Nutritional Guidelines

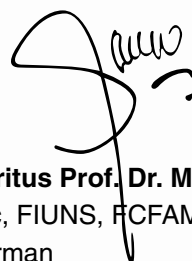
Individuals' dietary behavior are of primary interest to public health professionals, nutritionists/dietitians and food industry alike. The impact of what an individual eat on health outcomes is rarely influenced by any one eating event or single food. Instead, health outcomes related to diet are a result of complex combinations of foods eaten together over time.

Dietary guidelines remain a useful tool in providing nutrition information and advice for the public that is credible from a scientific perspective and easy to understand and follow.

The Malaysian Dietary Guidelines 2020, a revised version on MDG 2010 comprise of 14 Key messages with 52 key recommendations and how to achieve, prepared by the Technical Working Group Nutritional Guidelines provide valuable information to related stakeholders to help individuals make healthier food choices.

The Technical Working Group are hopeful that the guidelines will be widely used as a reference and we look forward for feedback from stakeholders and end users to help us update and improve the guidelines from time to time.

I would like to thank members of the Technical Working Group, the writers, the Focus Discussion Group, the Editorial team, the Consensus Workshop participants, the TWG Secretariat and all those who assisted this valuable document for their hard work and dedication.



Emeritus Prof. Dr. Mohd Ismail Noor

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Acknowledgement

Individuals from various Departments and Institutes, the Ministry of Health Malaysia, academicians from local universities, nutritionists, dietitians, representatives from related professional bodies, representatives from the food manufacturing and trading industry, and consumer bodies are all acknowledged by the Technical Working Group on Nutritional Guidelines. Their invaluable contributions and dedication to completing this document successfully are sincerely appreciated.

A word of gratitude is also conveyed to the:

- Director of National Institutes of Health
- Director of Disease Control Division
- Director of Food Safety and Quality Division
- Directors of State Department of Health (all over Malaysia)
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Be physically active every day

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Eat plenty of vegetables and fruits everyday

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Key Message 6 :

Eat adequate amounts of rice, other cereals, whole grain cereal-based products and tubers

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Make effective use of nutrition information on food labels

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The documentation of the Malaysian Dietary Guidelines (MDG) 2020 was coordinated by the Technical Working Group (TWG) on Nutritional Guidelines, which is under the purview of the National Coordinating Committee on Food and Nutrition (NCCFN), Ministry of Health Malaysia. The Nutrition Division, Ministry of Health Malaysia served as the secretariat for the MDG 2020.

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MALAYSIAN DIETARY GUIDELINES 2020

EXECUTIVE SUMMARY

Malaysian Dietary Guidelines (MDGs) are government endorsed documents intended to provide specific recommendations and advice on healthy diets and lifestyles. They are intended to influence consumer food choice based on latest scientific findings on food and nutrient intakes, food supplies, prevalence and public health importance of diet-related health and nutrition outcomes, cultural preferences, and other considerations. It forms the basis for educational programmes and the national food and nutrition policies. The challenge for any dietary guidelines would be to have a coherent policy that take into consideration not only the healthy dietary choices and personal health but also the wider social and environmental impact towards achieving a global environmental sustainability.

The first Malaysian Dietary Guidelines was published in 1999 and revised in 2010. Over the last decade, our population continues to face the double burden of malnutrition by the coexistence of undernutrition problems (e.g. anaemia, stunting and wasting) along with overweight, obesity and diet-related non-communicable diseases (e.g. hypertension, diabetes mellitus, cardiovascular diseases and certain forms of cancers). The recent NHMS (2019) revealed 50% (1 in 2) of adult population are either overweight or obese. It has been shown that the traditional diets have been replaced by diets higher in fats, salt, sugar and low fiber as well as increase in sugar-sweetened beverages consumption; lower intakes of vegetables and fruits as well as higher weekly frequency of eating out. Therefore, the need to review and update the MDG 2010 in line with the latest review of Recommended Nutrient Intakes (RNI), 2017 was undertaken by the Technical Working Group for Nutritional Guidelines under the auspices of the National Coordinating Committee for Food and Nutrition (NCCFN), Ministry of Health Malaysia.

The MDG 2020 is written by a group of experts from the academia, Ministry of Health Malaysia and related professional bodies who have extensive knowledge of Nutrition and Health Science. Several drafts were reviewed, validated and approved by the TWG Nutritional Guidelines. The Key Messages, Key Recommendations and how to achieve were then vetted through Focus Group Discussion on 5-7 February 2020 comprising of Public Health personal (end-users) to determine the relevance and clarity of the statements. The final draft was then presented in a 3-day Consensus Workshop on 22-24 July 2020 involving relevant stakeholders from various Ministries, Government Agencies, Academia, Professional bodies, Industries and Consumer Associations for revision and approval.

The Malaysian Dietary Guidelines 2020 are intended for health professionals, policy makers, educators, food manufacturers, and researchers. It applies to all healthy adult Malaysians, as well as those with common health conditions such as being overweight. They do not apply to people who need special dietary advice for a medical condition.



The revised MDG 2020 features some of the following key updates:

- The MDG use the Recommended Nutrient Intakes for Malaysia (2017) that provide nutrient intake requirements for adults and suggested individual foods from various food groups that can be combined within diets to meet these requirements.
- The MDG 2020 is based on foods that are available, accessible and culturally appropriate for the population. These are used to construct recommended diet patterns that meet nutrient intake requirements and address our nutrition concerns including the excessive consumption of ultra-processed foods and drinks.
- It is primarily designed for adults population aged 18-59 years old.
- However, the Malaysian Food Pyramid 2020 is not just targeted for adults but it can be a reference of daily food intakes for the healthy population starting at the age of 7 and above. The recommended servings of each food group in the food pyramid is within a calorie range of 1500 – 2300 kcal.
- The Malaysian Food Pyramid 2020, maintained the five food groups which are placed at four levels however, it differs from the previous MDGs, in which, vegetables and fruits groups form the base of the new pyramid replacing the Carbohydrate food group. It is reconstructed taking into consideration the number of servings contributed by vegetables and fruits which constitute the most as compared to other food groups. Pictorial representation of the food pyramid has been improved to appreciate the relative portion size of each food group.
- The introduction of Malaysian Healthy Plate helps complement the Food Pyramid and guide users to create a healthy balanced meal.
- The 14 Key messages in the MDG 2020 are quite similar to the 2010 version however, each key message in the Malaysian Dietary Guidelines (MDG) 2020 have been revised and updated with recent scientific evidence.
- In view of a very high prevalence of “eating out” among adults, a new key message *“Cook Nutritious Food at Home More Often and Choose Healthier Options When Eating Out”* has been introduced to replace key message on “Breastfeeding” found in MDG 2010.
- The Malaysian Dietary Guidelines 2020 provide many options in their recommendations. The advice focuses on dietary patterns that promote health and wellbeing. It offers approximately 52 Key Recommendations and 244 statements on “how to achieve” to help users make informed choices toward healthier eating habits.

Key Messages of the Malaysian Dietary Guidelines 2020

- KM1** Eat a variety of foods within the recommended servings.
- KM2** Achieve and maintain a healthy body weight.
- KM3** Be physically active every day.
- KM4** Cook nutritious foods at home more often and choose healthier options when eating out.
- KM5** Eat plenty of vegetables and fruits every day.
- KM6** Eat adequate amount of rice, other cereals, whole grain cereal-based products and tubers.
- KM7** Consume moderate amount of fish, meat, poultry, egg, legumes and nuts.
- KM8** Consume adequate amounts of milk and milk products.
- KM9** Reduce intake of foods high in fat and limit saturated fat intake.
- KM10** Choose and prepare foods with less salt, sauces and flavour enhancers.
- KM11** Limit sugar intake in foods and beverages.
- KM12** Drink plenty of water daily.
- KM13** Consume safe and clean foods and beverages.
- KM14** Make effective use of nutrition information on food labels.



**KEY
MESSAGE
1**

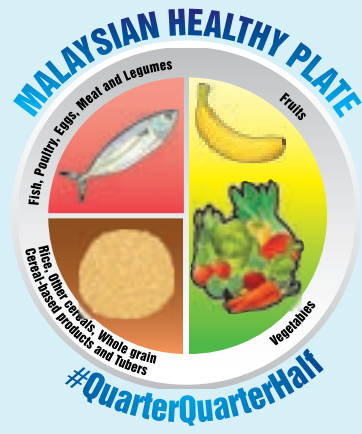
**Eat a variety of foods
within the recommended
servings**



KEY MESSAGE

1

EAT A VARIETY OF FOODS WITHIN THE RECOMMENDED SERVINGS



Prof. Dr. Norimah A. Karim, Ms. Rusidah Selamat, Dr. Sameeha Mohd Jamil, Ms. Teh Wai Siew, Asst. Prof. Dr. Nor Azwani Mohd Shukri, Prof. Dr. Chan Yoke Mun, Ms. Rohida Salleh Hudin, Ms. Khairul Zarina Mohd Yusop and Emeritus Prof. Dr. Mohd Ismail Noor.

1.1 Terminology

Adequate diet

An adequate diet provides enough energy, nutrients and fibre to maintain an individual's health. A diet that is adequate for an individual may not be adequate for another.

Balanced diet

A balanced diet is a diet that contains a combination of foods that provide a proper balance of nutrients. The body needs many types of foods in varying amounts to maintain health. The right balance of nutrients needed to maintain health can be achieved by eating proper balance of all healthy foods including fruit, vegetable, cereal, fish, meat, legume and milk.

Food groups

A food group puts together foods of similar nutrient content and function. There are five food groups which are vegetables; fruits; rice, other cereals, whole grain cereal-based products and tubers; fish, poultry/ eggs/ meat, and legumes; milk and milk products. These food groups contain

foods that are similar in calories, carbohydrate, protein and fat contents.

Healthy diet

A healthy diet is a diet which provides a proper combination of energy and nutrients. The four characteristics of a healthy diet are varied, adequate, balanced and moderate.

Malaysian Food Pyramid 2020

A food pyramid is a visual tool that is used as a guide to your DAILY food intake in achieving a healthy diet. It is developed to provide a guide for the types and amounts of food that can be eaten in combination to provide a balanced diet. A food pyramid consists of four levels that represent five food groups. The recommended number of servings per day for each food group is indicated next to it. From the bottom to the top of the food pyramid, the number of servings of each food group becomes smaller indicating that an individual should eat more of the foods at the base of the pyramid and less of the foods at the top of the pyramid.

Malaysian Healthy Plate

Malaysian Healthy Plate (MOH, 2016) is a visual guide to show the total food in each food group that needs to be consumed in a meal to achieve a healthy and balanced diet based on the principle of quarter, quarter, half. It is used to translate recommendations from the Malaysian Dietary Guidelines and Malaysian Food Pyramid to help Malaysians practise healthy eating habits by planning their daily meal.

Moderation

Moderation is a key to healthy diet. Moderation refers to eating the right amount of foods to maintain a healthy weight and to optimise the body's metabolic process.

Processed Foods

Edible parts of plants and animals after separation from nature or modified/preserved by minimal processes or modified with the addition of salt, sugar, oils or fats to preserve and enhance their sensory qualities. These include canned or bottled vegetables or legumes (pulses) preserved in brine; whole fruit preserved in syrup; tinned fish preserved in oil; some types of processed animal foods such as ham, nuggets, sausage, and smoked fish; most freshly baked breads; and simple cheeses to which salt is added (Monteiro *et al.*, 2019).

Recommended Nutrient Intakes (RNIs)

Recommended nutrient intakes are nutrient standards that used to plan and assess dietary nutrient intakes of healthy individual or population. Nutrient recommendations in RNI are differ with age, sex, and physical activity level. The range of intakes encompassed by the RNI should be considered sufficient to prevent deficiency, maintain optimal health while avoiding toxicity (NCCFN, 2017)

Serving size

In the Malaysian Food Pyramid, serving size is the recommended amount of foods consumed daily in household measures used for foods and drinks, for example cup, plate, bowl, tablespoon, teaspoon and glass. However, serving size defined in the Malaysian Food Pyramid may not be equal to a serving size defined in a food label.

Unprocessed and minimal processed foods

Unprocessed (or natural) foods are the edible parts of plants (such as fruit, leaves, stems, seeds, roots) or from animals (such as muscle, offal, eggs, milk), and also fungi, algae and water, after separation from nature. Whilst, minimally processed foods are natural foods altered by methods that include removal of inedible or unwanted parts, and also processes that include drying, crushing, grinding, powdering, fractioning, filtering, roasting, boiling, non-alcoholic fermentation, pasteurization, chilling, freezing, placing in containers, and vacuum packaging. Unprocessed and minimally processed foods vary in energy density and in their content and balance of fats, carbohydrates, proteins, and their fractions, and in vitamins, minerals and other bioactive compounds. (Monteiro *et al.*, 2019b; Lane *et al.*, 2020).

Ultra-Processed Foods (UPFs)

Ultra-processed foods are characterised by NOVA as industrial formulations generated through compounds extracted, derived or synthesized from food or food substrates. Ultra-processed foods also commonly contain artificial substances such as colours, sweeteners, flavours, preservatives, thickeners, emulsifiers and other additives used to promote aesthetics, enhance palatability and increase shelf life. Ready to eat food and beverage, spreads, packaged snacks and pastries, cakes, instant noodles, pre-prepared ready to heat products are some examples of ultra-processed foods high in sugar, salt, fat and artificial substances (Monteiro *et al.*, 2019b; Lane *et al.*, 2020).

Variety

Variety refers to eating many different types of foods each day and to ensure better selection of healthier foods. By selecting a variety of foods, the chances of consuming the multitude of nutrients the body needs are optimised.



1.2 Introduction

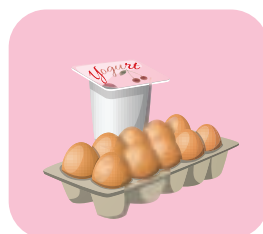
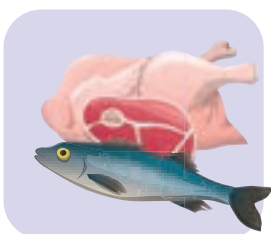
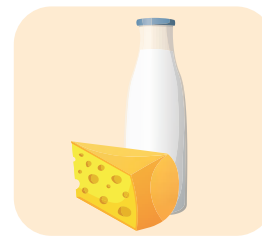
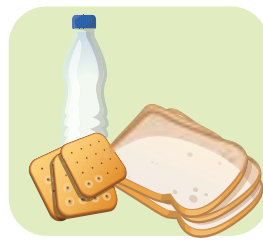
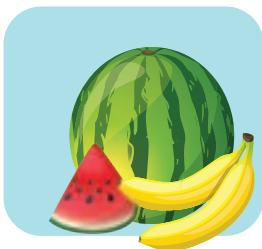
A healthy diet is important to supply nutrients, reduce risk and to manage certain diseases. Healthy and balanced eating habits provide energy and nutrients required by the body. The Malaysian Dietary Guidelines 2010, suggested three important considerations when planning healthy meals, specifically, (i) eating a balanced diet (ii) consume a wide variety of foods and (iii) consume foods in moderation (NCCFN, 2010). These recommendations have also been suggested by other dietary guideline from various countries such as USA (USDA, 2015), and Australia (NHMRC, 2013).

The accelerated phase of urbanisation and food industrialisation in recent decades has inevitably brought changes in the Malaysian dietary habits (NCCFN 2017). A major shift can be seen in the availability, accessibility, affordability of processed and convenient foods which influenced the consumer's food preferences and choices. The dietary changes towards affluent and convenient processed foods have been associated with the increasing prevalence of obesity irrespective of age, ethnic and social status. The adoption of Malaysian Food Pyramid 2020 recommendation in daily diet would benefit increasing consumption of freshly prepared dishes made from unprocessed or minimally processed foods and reducing consumption of processed foods especially ultra-processed foods and beverages. NOVA classification is one of the superlative techniques recognized by the Food and Agriculture Organization of the United Nations and the Pan American Health Organization as a valid tool to observe ultra-processed food (UPP) consumption FAO (2019).

It is very important that an individual ensures getting appropriate foods and incorporates the principle of good nutrition such as variety, a balanced intake of nutrients and in moderation. To ensure varieties in the daily diet, an individual is required to eat different types of foods within each level of food pyramid. This will enhance and optimise the nutrient needs of the body. In addition, eating food within the recommended number of servings is crucial. Thus, the recommendations from the Malaysian

Food Pyramid are translated into practice using the Malaysian Healthy Plate which guides us to plan our main meals. The Malaysian Healthy Plate (MOH, 2016) incorporates the principles of quarter, quarter, half. To estimate food portion, a 10-inch (25 cm) plate is used. It is recommended that the first quarter of the plate is filled with either rice, noodles, breads, grains, cereal products or tubers. This is followed by filling the second quarter of the plate with either fish, poultry, meat or legumes. The other half of your plate should be filled with vegetables and fruits. It however does not reflect the daily calories intake and serving sizes for each food group. In addition, plain water or unsweetened beverages, milk or dairy products should be consumed with the meal. Water is essential for many body functions for example regulating body temperature and digestion.

The MDG 2010 is revised and updated taking into consideration the many studies reporting the changes in food consumption patterns and dietary habits of Malaysians as well as nutritional and health related problems in Malaysia (IPH, 2014; Ahmad Ali *et al.*, 2019a; Ahmad Ali *et al.*, 2019b; Balasubramanian *et al.*, 2020; IPH, 2020). The recent national prevalence of overweight and obesity as reported in the NHMS 2019 was 50.1% (IPH, 2020). The prevalence was the highest among women (54.7%), Indians (63.9%) and the 55-59 years old age group (60.9%). Similarly, abdominal obesity was present in 50% of adults, again highest among women (64.8%) and Indians (68.3%). It has been shown that the traditional diets have been replaced by diets higher in fats, salt and sugar-sweetened beverages; usually with lower intakes of fresh fruits and vegetables as well as higher weekly frequency of eating out (Balasubramanian *et al.*, 2020). In an earlier study, Fournier *et al.* (2016) reported about 64% of Malaysians had at least one meal per day outside of home, 23.4% had meals at home, and 12.5% will eat at home with outside food. Thus, it is very important that this revised MDG 2020 addresses these emerging dietary issues and diet-related health problems to guide Malaysian to eat a variety of foods within the recommended servings.





1.3 Scientific basis

1.3.1 Food groups

A healthy and balanced diet should include a variety of choices from each of the following five food groups, namely vegetables; fruits; rice, other cereals, whole grain cereal-based products and tubers; fish, poultry/ eggs/ meat, and legumes; milk and milk products. Each of these food groups provides an array of nutrients, and the amounts recommended that promote positive health outcomes. The WHO (2003) suggested the consumption of a variety of foods from different food groups, with emphasis on plant-based foods. Consuming foods from each group in the appropriate amount each day allows the individual to achieve the requirements for energy, carbohydrates, proteins, and fats as well as vitamins and minerals. In addition to the essential nutrients, different foods also provide fibre and phytochemicals (found in plants), many of which are protective against diseases. Some of these compounds act as antioxidants, which protect the body's cells from being damaged. Eating a variety of foods also keeps our meals interesting and full of flavour (McCrary *et al.*, 2012; NHMRC, 2013). The following sections describe the food groups in general and highlight nutrients for which the food group is a key contributor.

In this revised MDG 2020, the food groups are still placed in the four levels of the Malaysian Food Pyramid. The Malaysian RNI (NCCFN, 2017) recommends that carbohydrate, protein and fat contribute to 50-65%, 10-20% and 25%-35% of the total caloric intake per day. This recommendation is used to calculate the number of servings to be consumed per day for each food group. The Malaysian Food Pyramid 2020 is reconstructed taking into consideration the number of servings contributed by vegetables and fruits which constitute the most as compared to other food groups.

There are many types of vegetable that are often classified based on their edible part mainly leaves, stems, roots, flowers and fruits vegetable. Vegetables are low in fat and carbohydrate but high in vitamins, minerals and fibers. Consumption of a variety of vegetables contributes an array of nutrients. For example, green leafy vegetables such as spinach (*bayam*), mustard green (*sawi*), and swamp cabbage (*kangkung*) are generally high in folate, vitamin K and potassium, while red and orange vegetables (i.e., carrots, tomatoes, pumpkins) provide the most vitamin A. Vegetables are a good source of dietary fibers and it can prevent constipation. Vegetable should

be eaten either raw or cooked instead of as juices to optimise its health benefits. While it is best to cook certain vegetables to make them more palatable and increase the availability of the nutrients (Colle *et al.*, 2010), with minimal cooking process as well as minimal use of cooking oil or coconut milk (*santan*).

Together with vegetables, fruits are now placed at the base of the Malaysian Food Pyramid 2020. Fruits generally taste sweet, juicy and most of fruits are eaten fresh and raw. Fruits are excellent source of vitamins, minerals, fibers which rich in antioxidants including flavonoids, polyphenols and etc. Consumption of adequate fruits in a daily diet will improve immune system, prevent constipation and other chronic diseases. Most of fruits are low in fat, sodium, calorie and high in potassium. It is advised to eat fruits in the whole form, although it can be taken in the form of fruit juice (without added sugar) limit to once a day. Processing of fruits into juices lower fruit juice can be part of healthy eating patterns, processing of fruits into juices lower its dietary fibre content and can spikes blood glucose level. Fruit juice drink and fruit drink products sold in the market are considered to be sugar-sweetened beverages rather than fruit juice because they are primarily composed of water with added sugars. More information on vegetables and fruits can be found in Key Message 5.

Cereal especially rice is the staples for Malaysian. The Malaysian Food Pyramid 2020 is differs from the previous food pyramid, in which, vegetables and fruits groups form the base of the new pyramid replacing the carbohydrate food groups. Nevertheless, rice remain as staple food for Malaysian. It is recommended to consume at least half from the total serving size of the cereal and cereal-based products in form of whole grains. Wholegrains (e.g., brown rice, oats, barley, quinoa) contain the entire kernel, including the endosperm, bran, and germ. Refined grains differ from wholegrains in that the bran and germ are removed, whereby essential components such as dietary fibre, iron, vitamin Bs and other nutrients are minimally retained. A higher intake of wholegrains are associated with lowered risk of non-communicable diseases (NCDs) (Reynolds *et al.*, 2019). The intake of refined grains and products especially those high in saturated fats, sugars, and salt, such as cakes, crackers, and creme-filled biscuits and buns should be limited. More information on grains and cereal products can be found in Key Message 6.

Lean meats, fish, poultry, eggs and plant-based alternatives such as *tauhu*, legumes, nuts and seeds are protein foods. This is placed in the third level of the Malaysian Food Pyramid 2020. Besides protein, this food group provides a wide variety of other nutrients including iron, zinc, iodine, phosphorus, B vitamins (e.g., niacin, cobalamin, pyridoxine, and riboflavin), and essential fatty acids (omega 3 polyunsaturated fatty acids) among others. As in other food groups, each of the protein foods may provide different nutrients. For example, red meats are good sources of heme iron, which is more bioavailable than the non-heme iron found in plant sources. Fish and shellfish such as prawns provide more cobalamin and vitamin D, and essential fatty acids namely eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Similar with previous recommendation of daily protein intake, fish should be consumed everyday. In addition, the Malaysian Food Pyramid 2020 also recommended a serving of legumes daily. Legumes include peas, beans, lentils, and peanuts are rich sources of plant protein which contained phytosterols and dietary fibre (Trinidad *et al.*, 2010).

Nuts and seeds are highly nutritious and are of prime importance for people in Asia and Africa (Carlsen, Halvorsen & Blomhoff, 2011). Most nuts and seeds contain substantial amount of fat (55-70%) and protein (10-30%). In effort to increase intake of unsaturated fatty acids, 1 serving of seeds is included in the calculation of total energy intake from fat. Besides fats, protein and vitamins, nuts and seeds are rich sources of phytochemicals including flavanoids (almonds, peanuts and pistachios), resveratrol (peanuts and pistachios), polyphenols and tocopherols (walnuts) (Carlsen, Halvorsen & Blomhoff, 2011), which may potentially reduce oxidative stress and risk of related diseases (Kim *et al.*, 2019, Moghtaderi *et al.*, 2020). More information on protein foods including nuts can be found in Key Message 7.

Milk and milk products, which are also placed in the third level of the Malaysian Food Pyramid 2020, provide a package of essential nutrients that is difficult to achieve in low-dairy or dairy-free diet (Rozenberg *et al.*, 2016). Besides calcium, milk and milk products such as cheese and yoghurt have various health benefits and are a good source of many nutrients, including protein, vitamin A, vitamin D, riboflavin, cobalamin, zinc, phosphorus, vitamin K₁, vitamin K₂ and milk fat globule phospholipids (Dehghan *et al.*, 2018). Low fat or skimmed varieties of milk and milk products are recommended. Individuals who are lactose intolerant can choose low-lactose and lactose-free milk products. More information on milk and milk products can be found in Key Message 8.

Fats and oils, sugars and salt are placed at the top of the Malaysian Food Pyramid 2020 because these foods should be consumed sparingly. Fats and oils, sugars and salt are not considered as food groups, but they are often found in foods. Sugars and salt improve foods palatability, however it can be replace or reduce by natural flavour enhancer such as spices and herbs. Fats and oils are good sources

for energy and essential fatty acids (arachidonic acid and alpha-linolenic acid). Fats also have other important physiological functions including fat metabolism generates bioactive lipid molecules, which are fundamental mediators of multiple signaling pathways (Orsavova *et al.*, 2015). Nevertheless, in light of Malaysian generally being physically inactive (IPH, 2020), excessive fat intake (more than 35% of energy intake) may lead to overweight and obesity. More information on fat and oils, sugars and salt can be found in Key messages 9, 10 and 11 respectively.

Malaysians have bethrothed extensive actions to alleviate the upsurge in obesity prevalence. One of the major challenges to curb obesity in Malaysia is due to abundant supplies of unhealthy foods and beverages products in the market. The over-reliance on processed foods, especially ultra-processed foods which high in energy, sugar, fat, salt and generally in combination with artificial substances such as flavour enhancers, colours, emulsifiers, and other additives to prolong shelf-life of the product (FAO, 2019). For instance, ready to eat food and beverages such as carbonated drinks, sweet or savoury snacks, chocolate, candies, ice-cream, mass-produced packaged breads and buns, spreads, cream filled biscuits, pastries, cakes including pre-prepared ready-to-heat products such as frozen currypuff, pasta and pizza dishes. It is gradually displacing home-prepared meals and the consumption of fresh fruit and vegetables in daily diets. Nowadays, ultra-processed foods are now often reformulated and advertised as if they are healthy, being labelled as for example 'light' or 'diet', or low in fat or sugar, or free from trans fats, or high in fibre or vitamins and minerals. These adjustments may improve the products which however remain ultra-processed and unhealthy (Monteiro *et al.*, 2019b). A systematic review and meta-analysis investigated the association between consumption of ultra-processed food and noncommunicable disease risk, morbidity and mortality demonstrated consumption of ultra-processed food was associated with increased risk of overweight, obesity, abdominal obesity, all-cause mortality, metabolic syndrome and depression in adults. In addition, consumption of ultra-processed food was associated with cardiometabolic diseases, frailty, irritable bowel syndrome, functional dyspepsia and cancer (breast and overall) in adults (Lane *et al.*, 2020).



1.3.2 Serving size

Based on the Recommended Nutrient Intakes for Malaysia (NCCFN, 2017) and the population's habitual intake (IPH, 2014), the number of servings calculated for the Malaysian Dietary Guidelines 2020 is based on 50-65% carbohydrate, 10-20% protein and 25-35% fat. The macronutrient contribution to the total energy intake (TEI) is then converted to exchange list to optimize the consumption of carbohydrate, protein and fat, subsequently converted to serving size (Shahar *et al.*, 2015). The number of servings for daily meal planning provide intakes of at least 90% of the Recommended Nutrient Intakes for Malaysian (RNI) for energy, carbohydrate, protein and fat. In MDG 2020, the number of servings recommended for the five food groups is based on 1500 kcal, 1800 kcal and 2000 kcal per day.

In the revised Malaysian Food Pyramid 2020, the five food groups are placed at four levels. Different from the previous MDG, vegetables and fruits group form the base of the new pyramid. It is reconstructed taking into consideration the number of servings contributed by fruits and vegetables which constitute the most as compared to other food groups. Such recommendation is also in line with the intention to consume more vegetables and fruits, considering the increasing prevalence of non-communicable diseases especially obesity and diabetes in Malaysia. The recommended number of servings is at least three servings or more of vegetables and two servings of fruits. One serving of vegetable is considered as zero calorie while one serving of fruit provides 15 g of carbohydrate and 60 kcal. In our main meal, the vegetables and fruits food groups should fill up half of the Malaysian Healthy Plate (MOH, 2016).

The second level is rice, other cereals, wholegrain cereal-based products and tubers group. The number of servings recommended for this group is three to five servings per day, based on the energy requirement. One serving of food in this food group contains 30 g of carbohydrate, 4 g of protein, 1 g of fat and 150 kcal. In our main meal, this food group should fill up only a quarter of Malaysian Healthy Plate.

The third level in the food pyramid 2020 consist of protein sources which are categorised into 3 groups namely i) fish, ii) poultry, meat and egg and iii) legumes. It is recommended to have one serving of fish daily, whereby one serving contains 14 g protein and 2 g of fat and 70 kcal. The recommendation for poultry/ meat/ eggs is one to two servings a day, of which one serving contains 14 g protein, 8 g of fat and 130 kcal. The cooked lean meat is limited to 500 g per week. Whilst, for protein from plant sources namely legumes are recommended one serving daily which contains 40 g protein, 8 g of fat and 130 kcal. Other than that, nuts and seeds are also protein sources but it contained high fat which contribute to high calorie, hence they can be consumed as snacks on a weekly basis. Both animal and plant based protein food should fill up only a quarter of Malaysian Healthy Plate.

In the Malaysian Food Pyramid 2020, the recommended number of servings for milk and milk products is 2 servings, in which one serving contains 12 g carbohydrate, 8 g protein, 5 g of fat and 125 kcal.



1.4 Current status

A number of nutritional surveys have been conducted to assess the dietary intake of Malaysians since 2010. The second Malaysian Adults Nutrition Survey (IPH, 2014) was a nationwide cross-sectional study of Malaysian adult population aged 18-59 years old (N = 2,973). This survey reported that the median energy intake of Malaysians (overall) was 1,466 kcal/day, with men reported to be consuming 1,489 kcal/day and women 1,445 kcal/day. The findings were comparable with previous MANS in 2003 (median overall 1,540 kcal/day; men 1,722 kcal/day; women 1,400 kcal/day) (Ahmad Ali *et al.*, 2019b). However, the MANS findings should be interpreted with caution as further analysis revealed that under-reporting of dietary intake has increased significantly from 53% in MANS 2003 to 61% in MANS 2014. The MANS in 2003 and 2014 showed that under-reporting of energy and nutrient intake still persisted. Dietary reanalysis after excluding of under-reporters showed that the revised mean energy intake was 2,097 kcal in MANS 2003 and 2,123 kcal for MANS 2014 (Ahmad Ali *et al.*, 2019b), respectively.

The Socio Cultural Research in Protein Transition (SCRiPT) study involving 1,604 Malaysian adults reported a mean energy intake of 1,776 kcal/day (men 1,869 kcal/day; women 1,699 kcal/day) (Drenowski *et al.*, 2020). In addition, the Malaysia Lipid Study which was conducted among Malaysian urban dwellers (N = 577) reported a mean energy intake of 1,825±413 kcal/day (Karupaiah *et al.*, 2019).

The findings of the MANS 2014 demonstrated that the median percentage of total energy contributed by macronutrients was 55% for carbohydrate, 16% for protein and 29% of fat. This was found to be similar in men and women (IPH, 2014). A more recent study reported a mean macronutrient distribution of approximately 54% carbohydrate, 14% protein, and 32% fat, respectively (Karupaiah *et al.*, 2019). Both nationwide and individual studies included in a review and meta-analysis consistently showed that Malaysian adults generally consumed adequate or higher protein (80% of RNI) and fat (\leq 30% of total energy intake) across different groups of respondents, regardless of the dietary assessments tool used (Shahar *et al.*, 2018). However, the findings were inconsistent with respect to carbohydrates with smaller studies reporting adequate intake (50-65% RNI) while a nation-wide survey (MANS 2014) reported a lower intake (Shahar *et al.*, 2018).

More recently, a literature review and meta-analysis was conducted to evaluate the best available evidence regarding energy and macronutrient intake among adults (aged 19 to 59 years) in Malaysia (Shahar *et al.*, 2018). Information regarding levels and status of intake in comparison to the Malaysian Recommended Nutrient Intake (NCCFN, 2017), and sources of macronutrients among the population, was collated from food balance sheets, national surveys, as well as individual studies. A total of 20 studies (five nationwide and 15 smaller studies)

were included. Both the review and meta-analysis results indicated that Malaysian adults generally met or exceeded recommendation for fat and protein but were inconsistent with respect to energy and carbohydrate. For example, the MANS 2003 and MANS 2014 studies showed inadequate energy intakes among Malaysian adults. However, the findings of the meta-analysis did not take into consideration the re-analysis of the MANS 2003 and 2014 data (Ahmad Ali *et al.*, 2019a).

The MANS 2014 evaluated the frequency of food consumption based on habitual intake of Malaysian adults aged 18 and 59 years during the last one year. The key findings of MANS 2014 revealed that the top ten foods consumed by Malaysians were rice (98.4%), hen egg (95.2%), green leafy vegetables (94.8%), chicken (94.5%), marine fish (93.5%), local kuih (79.9%), bread (78.3%), mee-hoon/ kuew-teow (77.5%), noodles (76.8%), and soy sauce (76.6%). In addition, white rice and sugar were the two top most foods consumed on daily basis as these were consumed by 89.8% and 55.9% of the Malaysian adults, respectively (IPH, 2014).

A recent review and meta-analysis on energy and macronutrient intake among adults (Shahar *et al.*, 2018) demonstrated that the major macronutrient sources in Malaysian adults' diet were animal products (poultry, meat, and fish) for protein, vegetable oils (palm oil and palm kernel oil) for fat, and white rice, vegetables, and sugar for carbohydrates. The most recent National Health and Morbidity Survey, NHMS 2019 (IPH, 2020) demonstrated that 94.9% (95% CI = 93.82, 95.79) of the Malaysians did not consume adequate fruits (2 servings per day) and/ or vegetables (3 servings per day) as recommended by the World Health Organization (WHO, 2003) or MDG 2010. This prevalence is consistently showing an increasing trend from 92.5% in the NHMS 2011 and 94.0% in the NHMS 2015 (IPH, 2020).

Attributed to the rapid urbanisation, increased household incomes, and greater dependence on processed food or eating out, Malaysia is experiencing a change in dietary trends. This nutrition transition involves the change from a traditional or agro-based, to a more 'westernised' or global diet and lifestyle (Popkin, 2006). This was evidenced by the findings of a study on an urban-living cohort comprising of typical racial mix of Malaysia (Balasubramanian *et al.*, 2020). The findings revealed four dietary patterns: 'Home Meal' pattern which represented a high intake of white rice, sugar-sweetened beverages, and non-starchy vegetables; 'Chinese Traditional' pattern – high intake of noodle dishes, unsweetened plain coffee or tea; 'Plant Foods' pattern – a high intake of fruit and non-starchy vegetables and low eating out frequency; and 'Sugar-sweetened Beverages' pattern – a high intake of sugar-sweetened beverages such as tea or coffee added with sugar or sweetened condensed milk, cocoa and malted beverages, and cordial or carbonated beverages. Among these, the 'Sugar-sweetened Beverages' pattern which was more dominant with Malay

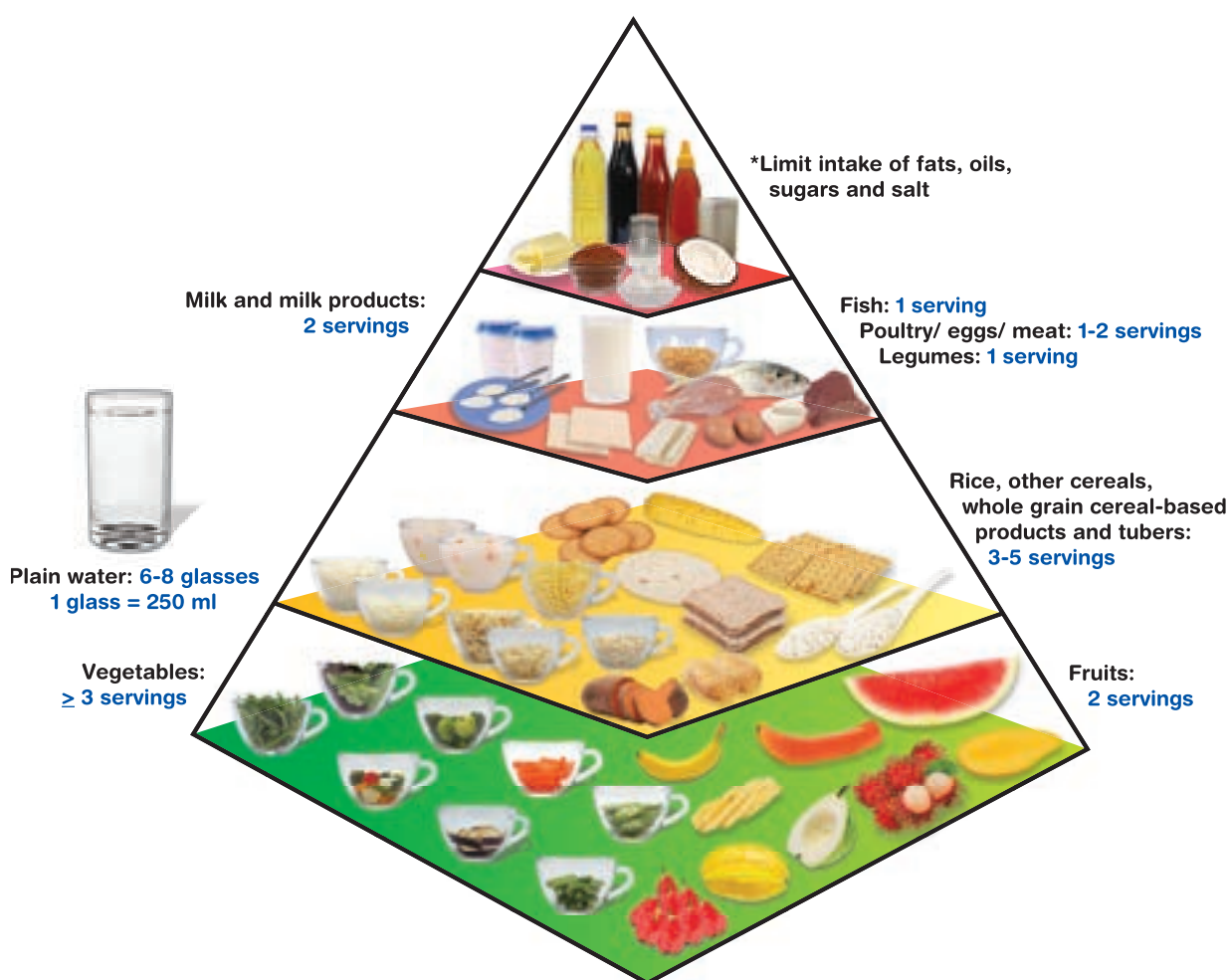
and Indian subjects, made up the largest proportion (35.1%). The study also found that men were least likely to practise the 'Plant Foods' pattern but most likely to have a diet that follows the 'Sugar-sweetened Beverages' pattern, whereas it was entirely reversed in women.

In a recent study, Drewnowski *et al.* (2020) reported energy intakes were 1,869 kcal/d for men and 1,699 kcal/d for women. Protein intakes were 78.5 g/d for men and 72.5 g/d for women. Higher energy and protein intakes were

associated with Chinese ethnicity, higher education and incomes. Frequency counts identified plant proteins in 50% of foods, followed by meat (19%), fish (12%), eggs (12%), and dairy (7%). Most frequent source of meat was chicken (16%) rather than pork or beef (1.5% each). In multivariate regressions, education, urbanization and ethnicity were associated with animal proteins; rural setting, age, ethnicity, and religion were associated with plant proteins. Protein choices involve socio-cultural as well as economic variables.

MALAYSIAN FOOD PYRAMID 2020

Guide to Your **DAILY** Food Intake



Notes:

- 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.
- * This includes ultra-processed foods which contain artificial substances such as colours, sweeteners, flavours, preservatives, and other additives.

Figure 1.1. Malaysian Food Pyramid 2020

1.5 Key Recommendations

Key Recommendation 1

Choose your daily food intake based on recommended number of servings in the Malaysian Food Pyramid 2020.

How to Achieve

1. Choose a combination of all food groups in the Malaysian Food Pyramid 2020 (Figure 1.1) to ensure the body gets all the nutrients needed within the recommended amount.
2. Choose the recommended number of servings for each food group based on your caloric needs (Table 1.1 and Table 1.2). For food serving equivalent list, please refer Table 1.3 to Table 1.9.
3. Plan your daily menu based on your recommended number of servings for each food group (Refer to Table 1.10 to Table 1.13 for menu examples).
4. Limit intake of fats and oils as well as salt and sugars in your daily diet.
5. Limit intake of processed and ultra-processed foods.

Table 1.1: Recommended number of servings for each food group based on 1500 kcal, 1800 kcal and 2000 kcal per day

Food group	Recommended number of servings		
	1500 kcal*	1800 kcal*	2000 kcal*
Vegetable ¹	≥ 3	≥ 3	≥ 3
Fruit ²	2	2	2
Rice, other cereals, wholegrain cereal-based products and tubers ³	3	4	5
Poultry/ Meat/ Egg ⁴	1	1	2
Fish ⁵	1	1	1
Legumes (combine bean, lentil and soy) ⁶	1	1	1
Milk & milk products ⁷	2	2	2
Fats /oils (including 1 serving from nuts and seeds) ⁸	6	8	9
Sugar ⁹	1	1	2

Notes:

Tips to remember, the more physically active you are, the more calories are required per day. However, if you are very sedentary, less calories are needed per day.

¹ Calorie free

² Based on 15 g carbohydrate and 60 kcal per serving;

³ Based on 30 g carbohydrate, 4 g protein, 1 g fat and 150 kcal per serving;

⁴ Based on 14 g protein, 8 g fat and 130 kcal per serving;

⁵ Based on 14 g protein, 2 g fat and 70 kcal per serving;

⁶ Based on 40 g carbohydrate, 14 g protein, 0.5 g fat and 220 kcal per serving.

⁷ Based on 15 g carbohydrate, 8 g protein, 1 g fat and 90 kcal per serving;

⁸ Based on 5 g fat and 45 kcal (including 1 serving of nuts & seeds = 5 g of fat and 65 kcal);

⁹ Based on 15 g CHO and 60 kcal. 1 serving of sugar = 3 teaspoons; 1 teaspoon = 5 g of carbohydrate and 20 kcal.

Sources: Suzana *et al.* (2015); *RNI (2017)

Table 1.2: Example of common foods (per serving) in household measurement for intake of 1800 kcal per day

Food group	Servings/ day	Serving size in household measurement
Vegetables	3	1/2 cup spinach, cooked 1 cup ulam 1/2 cup mixed vegetables, cooked (i.e., cabbage + carrot + baby corn + french bean)
Fruits	2	1 whole medium <i>pisang berangan</i> 1 whole medium apple
Rice, other cereals, wholegrain cereal-based products and tubers	4	2 slices wholemeal bread 2 scoops white rice, cooked 1 1/2 cups spaghetti, cooked 4 pieces wholegrain crackers
Poultry/ Meat/ Egg	1	1 medium chicken drumstick OR 1 palm size lean beef OR 2 hen eggs
Fish	1	1 medium Indian Mackerel (<i>ikan kembung</i>)
Legumes	1	1 1/2 square pieces tauhu
Milk & milk products	2	1 glass low fat milk 2 slices cheese
Fats/ oils	8	8 tsp
Sugar (including free sugar)	1	3 tsp

Note:

Please refer to Table 1.3 to Table 1.9 for list of foods in each food group with serving size.

Key Recommendation 2

Eat your main meals (breakfast, lunch and dinner) as recommended by the Malaysian Healthy Plate.

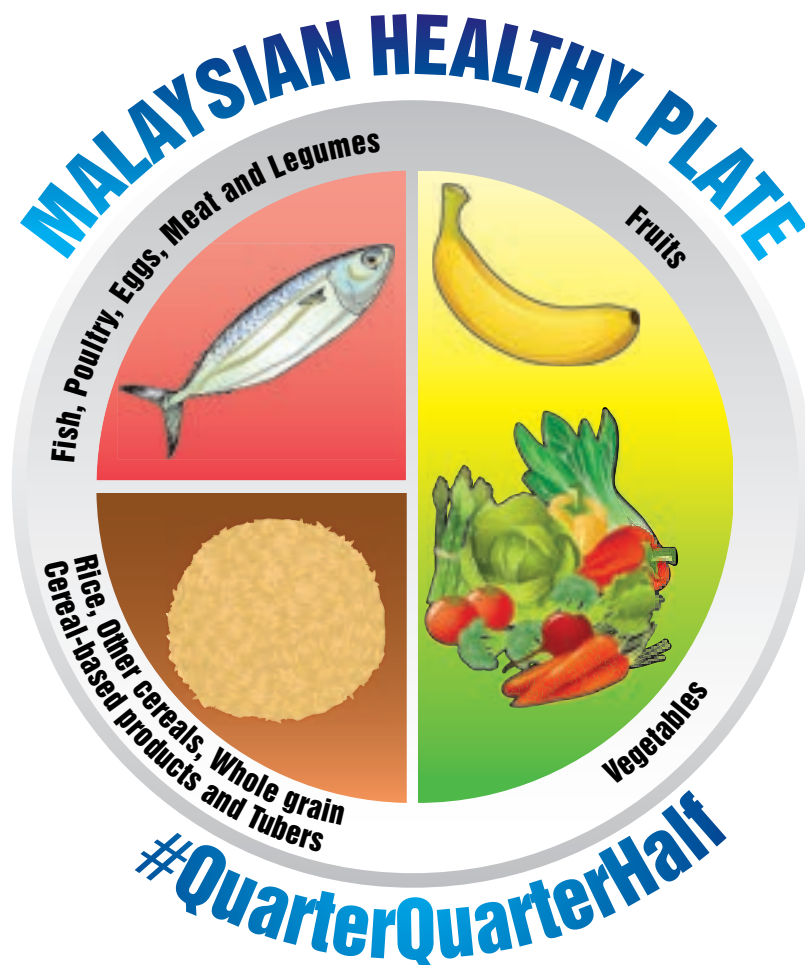


Figure 1.2: Malaysian Healthy Plate

How to Achieve

1. Use the Malaysian Healthy Plate for your daily main meals, which is based on the quarter-quarter-half concept (Figure 1.4).
 - a. Fill in the first quarter of your plate with rice/ other cereals (e.g: meehoon)/ wholegrain cereal-based products (e.g: wholegrain bread)/ tubers (e.g: sweet potato). It is recommended to fill in this first quarter with whole grains.
 - b. Fill in the second quarter of your plate with fish/ poultry/ meat/ egg/ legumes (e.g: dhal, tempeh, soy beancurd)/ dairy products.
 - c. Fill the other half of your plate with vegetables and fruits.
2. Drink plain water or unsweetened beverages with the meal.
3. Consume milk or milk products as recommended.
4. Add legumes as snacks if legumes are not included in your main meals.
5. Limit additional soy sauce, tomato sauce, chilli sauce and gravies high in salt, sugar and fat to your main meal.

Key Recommendation 3

Limit intake of processed and ultra-processed food.

How to achieve

1. Limit intake of ultra-processed foods such as soft drinks, sweetened breakfast cereals, salty fatty packaged snacks and instant noodles, which are nutritionally unbalanced.
2. Prepare or choose natural ingredients for cooking instead of using ingredients made from commercially prepared processed or ultra-processed foods such as fish ball, meat balls, salami, sausage and etc.
3. Reduce frequency of eating at fast food outlets and buying ready to eat frozen foods sold in convenient stores.
4. Be aware that advertising of ultra-processed products dominates commercial advertising of food; it often conveys incorrect or incomplete information about diet and health.
5. Shop mindfully. Limit purchasing of processed and ultra-processed products.



Additional recommendation: Nutrient supplements

Eating a variety of foods daily as guided by the Malaysian Food Pyramid should provide all the nutrients needed by the body. Therefore, supplements are not necessary for most individuals. Supplements of vitamins, minerals or fibre do not supply the nutrients and other essential components present in foods that are important to health. Nutrient supplements cannot be used as a substitute for proper food choices and supplements of some nutrients taken regularly in large amounts are harmful. However, supplements may be needed to meet specific nutrient requirements such as during convalescence, in pregnant and lactating women and for the elderly. Nutrient supplements should only be taken on the advice of nutritionists, dietitians and medical doctors.

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Appendices

Appendices

Table 1.3: Examples of vegetables equivalent to one serving

Groups of Vegetables	Serving size	(Weight)
Vegetables, cruciferous, cooked ^a	1/2 cup	(50 g)
Vegetables, green leafy vegetables with edible stem, cooked ^b	1/2 cup	(40 g)
Vegetables, fruit, cooked ^c	1/2 cup	(40 g)
Vegetables, leafy <i>ulam</i> , raw ^d	1 cup	(50 g)
Vegetables, beans, cooked ^e	1/2 cup	(50 g)
Vegetables, flowers, cooked ^f	1/2 cup	(50 g)
Vegetables, sprouting, cooked ^g	1/2 cup	(50 g)
Vegetables, starchy ^h	1/2 cup	(60 g)
Vegetable juice, with pulp, no sugar added	1/2 glass	(125 ml)
Other vegetablesⁱ:		
Mushroom (white/ brown/ shitaki/ enoki, erygii, button, oyster mushroom), fresh/ soaked, cooked	1/2 cup/ 6 pieces	(40 g)
Fungus (black fungus, white fungus), cooked	1/2 cup	(40 g)
Mixed vegetables, cooked ^j	1/2 cup	(50 g)
Wolfberry (Goji berry), dried	1 cup	(50 g)

Note:

* Serving size and food weight are measured in edible portions.

^a Cruciferous such as cabbage, broccoli and cauliflower.

^b Green leafy-vegetables with edible stem such as *kangkung*, *sawi*, *pucuk manis*, *bayam*, *sayur meranti*, *kau kee*, *daun keledak*, drumstick leaf, gongura, tropical amaranths, sessile joyweed, tong ho kalan and makchoi.

^c Fruit vegetables such as brinjal, tomato, chayote (*fo shou gua*), capsicum, angled loofah (petola), bitter gourd, sour eggplant (*terung asam Dayak*), squash, snake gourd, pointed gourd (*parwal*), ridged gourd (*turai*) and bottle gourd.

^d Leafy *ulam* such as pegaga, *ulam raja*, lettuce and garden salad.

^e Vegetables, beans such as string bean, snow pea, lady fingers and French bean.

^f Vegetables, flowers such as daylily (golden needles/ *jin zhen cai*) and asparagus.

^g Vegetables, sprouting such as soya sprout, green bean sprout (*taugeh*), pea sprout (*dou miao*) and alfalfa.

^h Vegetables, starchy such as carrot, radish, pumpkin, beet root, lotus root, yam bean (*sengkuang*), water chestnut (*sengkuang china*), Chinese yam (*huai san*) and arrowroot (*fen ge*).

ⁱ Other vegetables such as mushroom, fungus and seaweed are rich sources of micronutrients such as iron, iodine and Vitamin B12 but low in fibre. Consume with other vegetable groups such as cruciferous, green leafy-vegetables and fruit vegetables to obtain optimum phytonutrients.

^j Mixed vegetables refers to a combination of several types of vegetables such as cabbage + carrot + baby corn + French bean.

Table 1.4: Examples of fruits equivalent to one serving

Fruits	*Serving size (weight)	
Ambarella (<i>kedondong</i>)	6 whole medium sized	(200 g)
Guava	1 big slice	(110 g)
Banana, <i>berangan</i>	1 whole medium sized	(60 g)
Banana, Cavendish	1/2 whole medium sized	(60 g)
Banana, <i>mas</i>	2 whole medium sized	(60 g)
<i>Ciku</i>	1 whole medium sized	(80 g)
Dragon fruit, red	1 slice/ 1/3 whole medium sized	(135 g)
<i>Langsat</i>	20 whole fruits	(180 g)
Mango	1/2 whole large sized	(100 g)
Papaya	1 slice/ 1/4 whole medium sized	(110 g)
Pineapple	1 slice/ 1/4 whole medium sized	(150 g)
Water apple (<i>jambu air</i>)	10 whole fruits	(500 g)
Watermelon	1 big slice	(250 g)
Apple	1 whole medium sized	(110 g)
Durian (7 x 3 cm)	5 ulas	(40 g)
Grapes	8 small	(90 g)
Jackfruit (<i>cempedak</i>)	4 pieces	(60 g)
Jackfruit (<i>nangka</i>)	5 pieces	(190 g)
Pear, green	1/2 whole medium sized	(100 g)
Pear, yellow/ Orange	1 whole medium sized	(160 g)
<i>Rambutan</i> (4.5 X 3cm)	6 whole fruits	(110 g)
Orange (Limau manis)	1 whole, medium	(134 g)
Dates, pitted, dried	2 pieces	(20 g)
Raisin	1 heap dessert spoon	(20 g)
Prunes, pitted, dried	4 pieces	(20 g)
Figs, dried	3 pieces	(25 g)
Fruit juice, with pulp & without added sugar	1/2 glass	(125 ml)

Note:

*Serving size and food weight are measured in edible portions.

Table 1.5: Examples of rice, other cereals, whole grain cereal-based products and tubers equivalent to one serving

Rice, other cereals, whole grain cereals-based products and tubers	*Serving size (weight)	
Rice, brown/ multigrain/ unpolished/ parboiled/ white, cooked	1 cup/ 2 rice scoops	(100 g)
Noodles, <i>mee-hoon</i> made of brown/ white rice flour/ sago noodles (<i>tang-hoon</i>), soaked	1½ cups	(150 g)
Noodles, mee/ kuih-teow / laksa, wet	1 cup	(100 g)
Pasta/ spaghetti/ macaroni, cooked	1½ cups	(150 g)
Porridge, brown/ white rice, plain, cooked	2 cups	(330 g)
Corn, without skin and cob, cooked	⅓ medium ear	(40 g)
Corn kernel, without margarine, cooked	3 dessert spoons/ ⅓ commercial cup	(40 g)
Cornflake, without milk and added sugar	1 cup/ 8 dessert spoons	(30 g)
Bran, coarse, uncooked	1 cup/ 10 dessert spoons	(100 g)
Oats (rolled/ processed)/ wheat germ, uncooked	6 dessert spoons	(40 g)
Muesli, without milk	4 dessert spoons	(45 g)
Quinoa, cooked	1 cup/ 2 rice scoops	(150 g)
Wheat (<i>gandum</i>)/ barley, without gravy, cooked	12 dessert spoons/ ¾ cup	(150 g)
Potatoes, without skin, raw	2 whole medium sized	(160 g)
Sweet potato/ yam (taro)/ tapioca, without skin, raw (1 cm cube)	½ cup/ ⅓ of a whole medium sized	(70 g)
Bread, wholemeal/ ryemeal/ white	2 square slices	(60 g)
Roti canai	1 piece	(95 g)
Bread, pita, wholemeal	½ piece	(40 g)
Bun ^a	1 rectangular bun/ 2 small buns	(50g)
Capati (D= 20cm)	½ piece	(50 g)
Dosai/ rawa dosai (D=20cm)	1 piece	(80 g)
Idli (D= 6cm)	2 small pieces	(110 g)
Pau, with filling	½ piece	(40 g)
Putu mayam	2 pieces	(100 g)
Biscuit, wholemeal crackers/ Marie/ milk ^b	5 pieces	(30 g)
Biscuits, plain/ cream crackers/ oatmeal ^b	4 pieces	(45 g)

Note:

* Serving size and food weight are measured in edible portion.

** Preferably choose wholegrain foods in your daily diet.

^a Choose healthier bun such as less sweet, no cream or sweet filling, and fortified with micronutrients or healthy ingredients.

^b Choose healthier biscuits such as low fat, sugar, no cream or sweet filling and low sodium.

Table 1.6: Examples of legumes, nuts and seeds equivalent to one serving

Legumes, nuts and seeds	Serving size (weight)	
Soya bean, yellow/ black, cooked	1 cup	(180 g)
Soya bean cake, fermented (<i>tempeh</i>)	2 rectangular pieces	(90 g)
Soya bean curd, tau-kua/ hard/ traditional/ fried tau-hoo, compressed tau-hoo (<i>dou fu gan</i>), (6 x 6 cm)	1½ pieces	(150 g)
Soya bean curd, soft tau-hoo (<i>tau hu lembut</i>), (18 x 5 cm)	1 box	(240 g)
Soya bean curd, <i>tau-hoo-pok</i> , (D= 3 cm)	4 round pieces	(60 g)
Egg tau-hoo (<i>tau hu telur</i>)	1½ packet	(200 g)
Soya bean chip (<i>dou bao</i>), fresh (5 x5 cm)	5 pieces	(50 g)
Soya bean sheet (<i>fucok</i> sheets), dried, raw (42.5 x 14 cm)	1 sheet	(30 g)
Soy bean milk, fresh, unsweetened	1½ glasses	(375 ml)
Soy bean dessert, tau-hoo-fah, unsweetened	2 containers	(700 g)
Gram, chickpeas/ black-eyed peas/ kidney beans, without gravy, cooked	1 cup	(180 g)
Gram, red beans/ mung beans, without gravy, cooked	1½ cups	(260 g)
Dhal, various split pea/ lentils (<i>chana dhal/ kadalei</i> , red lentils/ <i>masoor</i> , green lentils, <i>urad</i>), cooked	1 cup	(180 g)
Baked beans/ green peas, beans only, canned	1½ cups/ 1 whole medium canned	(400 g)
Lotus seeds ^a	1 cup	(120 g)
Nuts, peanuts/ almonds/ cashew nuts ^b	10 pcs/ 2 dessert spoons	(15 g)
Nuts, walnut ^b	1 pc	(15 g)
Seeds, chia seeds/ flax seeds/ pumpkin seeds/ sesame seeds/ watermelon seeds/ sunflower seeds ^b	2 dessert spoons	(15 g)
Seeds, <i>kuac</i> ^b	10 pcs/ 2 dessert spoons	(15 g)

Note:

* Serving size and food weight are measured in edible portion.

^a Lotus seeds are categorised as nuts and seeds group, but considering this food is a good source of protein and low in fat. Therefore, the serving size of lotus seed was calculated based on protein content instead of fat.

^b Nuts and seeds were calculated based on fat exchange. 1 serving of nuts/ seeds = 5 g of fat.

Table 1.7: Examples of fish and seafood equivalent to one serving

Fish and seafood	Serving size (weight)	
Fish, mackerel, Indian, without head & entrails, raw ^a	1 whole medium sized	(70 g)
Fish, bream, African (<i>ikan tilapia</i>), without head & entrails, raw	1 whole medium sized	(90 g)
Fish, sardine/ tamban, without head & entrails, fresh, raw	2 whole small sized	(60 g)
Fish, scad, yellow tail (<i>ikan selar</i>), without head & entrails, raw ^b	² / ₃ of a whole medium sized	(70 g)
Fish cut, mackerel, Spanish (<i>ikan tenggiri</i>), raw ^c (14 cm x 8 cm)	1 piece	(70 g)
Fish, sardine, canned	3 small pieces/ ² / ₃ of a small can	(90 g)
Anchovies, whole/ without head & entrails, dried	² / ₃ cup	(25 g)
Prawn, without head & shell, raw	12 pieces	(80 g)
Squid, without skin & entrails, raw	1 whole medium sized	(80 g)

Note:

* Serving size and food weight are measured in edible portion.

^a Fish, mackerel Indian include *ikan kembong*, *pelaling*, *mabung* and *termenung*.

^b Similar serving size and food weight for *ikan cincaru*, *Selayang*, *bawal (hitam, tambak, putih)* and *keli*.

^c Similar serving size and food weight for barred Spanish (*ikan tenggiri batang*), sting ray (*ikan pari*) and salmon.

Table 1.8: Examples of poultry, meat and egg equivalent to one serving

Poultry, meat and egg	*Serving size (weight)	
Chicken, drumstick/ thigh, without bone, raw	1 piece	(100 g)
Chicken, breast, without skin, raw (14 x 7 x 1 cm)	¹ / ₂ medium sized piece	(70 g)
Chicken, cut into 12 pieces, raw	1 piece	(70 g)
Beef, lean (1 palm size), raw	1 piece	(60 g)
Egg, century/ duck	2 whole	(120 g)
Egg, hen, grade A, without shell	2 whole	(100 g)
Egg, quail, without shell	12 whole	(120 g)

Note:

* Serving size and food weight are measured in edible portion.

Table 1.9: Examples of milk & milk products equivalent to one serving

Milk & milk products	Serving size (weight)	
Milk, full cream/ fresh/ low fat	1 glass	(250 ml)
Milk, evaporated	1/2 glass	(125 ml)
Milk, powdered, full cream/ skimmed (heap)	4 heap dessert spoons	(30 g)
Cheese, cottage/ spread	3 heap dessert spoons	(40 g)
Cheese, processed, slice (8 x 8 cm)	2 square slices	(40 g)
Yoghurt, natural/ fat free/ low fat, plain	2 yoghurt pots	(270 g)
Yoghurt, Greek style	1 yoghurt pot	(135 g)

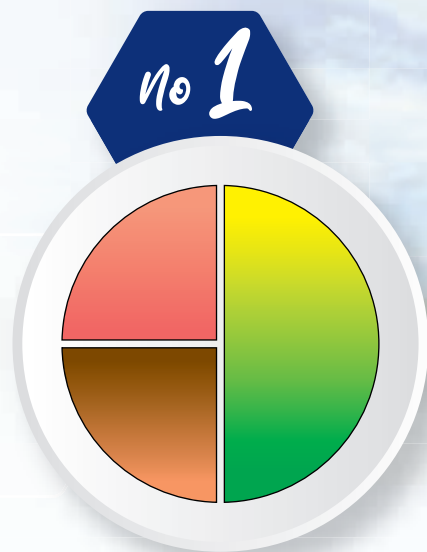
Standard household measurements used in this dietary guideline are as follows:

▪ 1 rice scoop	= 50 g	▪ 1 teaspoon (tsp)	= 5 ml
▪ 1 tablespoon (tbsp)	= 15 ml	▪ 1 glass	= 250 ml
▪ 1 dessert spoon (dsp)	= 10 ml	▪ 1 cup	= 200 ml



Figure 1.3: Standard household measurements used in this dietary guideline

In ensuring the intake of your main meals (breakfast, lunch and dinner) is healthy and in accordance with your daily requirement, the following are the steps on how to plan and take your main meal using the Malaysian Healthy Plate:

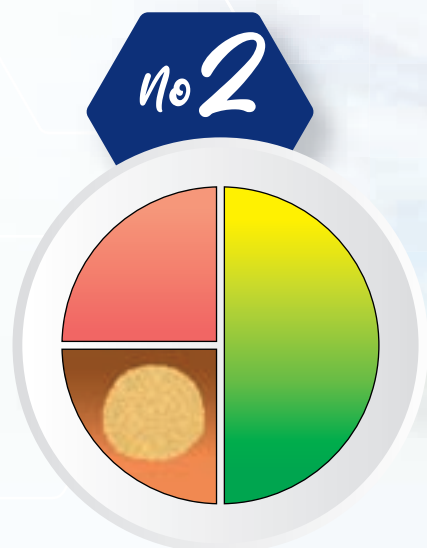


Step 1

Imagine of the three parts in a plate.

Explanation

- Use a round plate with 10 inches (25 cm) in diameter. Imagine there is a line at the middle of the plate. Then, on one half of the plate, divide it further into two parts: thus nabbed 3 parts on the plate.
- The foods and their serving size from each part are interchangeable within same food group.



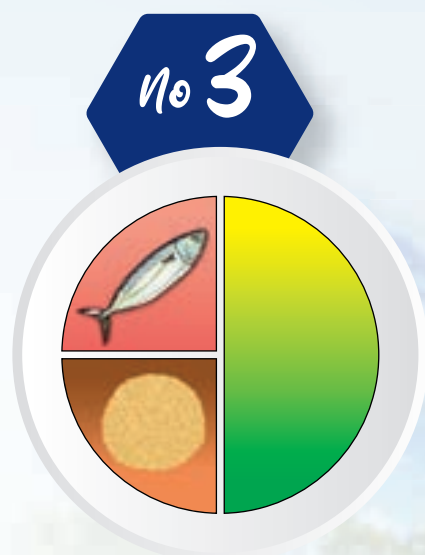
Step 2

Fill in the first quarter of your plate with rice/ other cereals (e.g: meehoon)/ wholegrain cereal-based products (e.g: wholegrain bread)/ tubers (e.g: sweet potato). It is recommended to fill in this first quarter with whole grains.

Explanation

- This food group is the major source of energy where rice is a staple food for Malaysians.
- The types of rice commonly consumed are brown/ white rice, and glutinous rice. Other grains and cereal products are noodles, pasta, breads, corns, barley and oats. Some examples of tubers are potatoes, sweet potatoes and cassava.
- Malaysians are encouraged to take whole grain to fill this quarter of this plate.
- Taking whole grain can help reduce constipation and increase the satiety that helps in weight management and reduces the risk of heart disease and diabetes.
- Whole grain is also an important source of fibres, vitamins and minerals.
- Examples of whole grain include brown rice, whole meal breads, whole grain noodles, whole grain pasta, whole grain biscuit, whole grain capati, oats, barley and corns.

Figure 1.4: How to plan and take your main meal using the Malaysian Healthy Plate

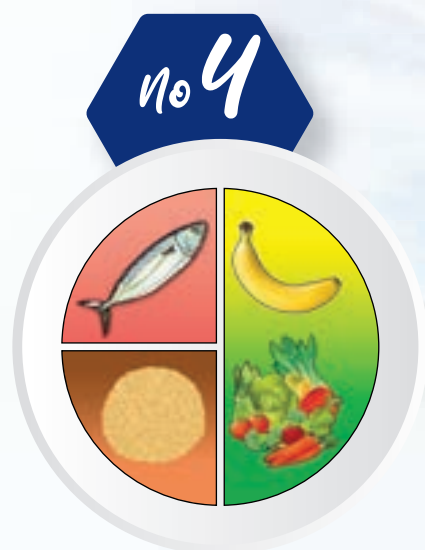


Step 3

Fill in the second quarter of your plate with fish/ poultry/ meat/ egg/ legumes (e.g: dhal, tempeh, soy beancurd)/ dairy products.

Explanation

- Protein in human diet comes from two main sources, namely animal protein (e.g., fish, meat, chicken, eggs) and plant protein such as legume (e.g. soya bean, tempeh), beans (e.g. green peas, baked beans) and lentils (e.g. chana dhal, green lentils).
- Protein is an important nutrient in building and restoring body tissues.
- It is recommended to eat fish more often in a week than other protein sources. Fish such as tuna, salmon, Indian mackerel (ikan kembung), Spanish mackerel (ikan tenggiri), contain omega 3 fatty acids that are important for a healthy heart.
- Choose chicken, mutton and meat with less fat to reduce the saturated fat intake and help maintain normal cholesterol levels.
- A diet with high saturated fat increases the risk of coronary heart diseases.
- Plant proteins including legumes (e.g., dal, bean, red beans, soya beans, almonds, walnut, pistachio) and seeds (sunflower seeds) are also encouraged as these foods are low in saturated fat and contain vitamins and minerals such as zinc, iron and magnesium.



Step 4

Fill the other half of your plate dishes with vegetables and add fruits.

Explanation

- Vegetables that are encouraged to be taken are green leafy vegetables (e.g., spinach, green mustard and salad), coloured vegetables (e.g., red spinach, purple cabbage), fruit vegetables (e.g., capsicum, pumpkin, tomato and cucumber and beans (e.g., long beans and beans), ulam (e.g., pegaga and ulam raja) and edible vegetable stems (e.g., celery and asparagus).
- Prepare vegetables using healthy cooking methods such as steaming, blanching and stir frying.
- Fruit such as guava, kedondong, papaya, banana, melon and mango are encouraged to be taken in daily diet.
- Vegetables and fruits are rich in fibres, vitamin and minerals that are beneficial to health.
- A high fibre diet can reduce the risk of cardiovascular diseases, obesity and diabetes.

Figure 1.4: How to plan and take your main meal using the Malaysian Healthy Plate (cont...)

Step 5

To complete the plate, drink plain water or unsweetened beverages, milk or dairy products.

Explanation

- Plain water is encouraged to be taken to replace sugary drinks to help reduce calorie intake and control body weight and dental caries.
- Drink at least 6-8 glasses of plain water daily.
- Milk and milk products are an important source of calcium for healthy teeth and bones.

- Milk and milk product also an important source of protein, vitamin A, riboflavin (vitamin B2) and potassium.
- It is advisable to choose for fresh/ full cream milk and milk product. For those tend to losing weight or patients with hyperlipidemia, choose low fat or skim milk and milk product.
- Intake of unsweetened soya bean or soy products (tofu, tempe) also helps fulfill the calcium requirement.

Malaysian Healthy Plate



Figure 1.4: How to plan and take your main meal using the Malaysian Healthy Plate (cont...)

Table 1.10: Example of one day menu and serving size of each food group for **1500 kcal**

Meal time	Example of one day menu
Breakfast	2 slices (60 g) of wholegrain bread
	1 glass of milk
Morning tea break	1-2 pots of plain yoghurt
Lunch	2 scoops of brown rice
	1 scoop (60 g) of stir-fried spinach with tauhu
	1 scoop (30 g) of string beans + brinjal
	1 piece of fried fish with chilli (80 g)
	1 whole medium apple
	1 glass of plain water
Afternoon tea break	1 glass of unsweetened soya milk
Dinner	2 scoops of brown rice
	1 scoop (60 g) of stir-fried kangkung
	1 bowl of (250 g) of chicken soup with carrot
	1 slice (159 g) of papaya medium size
	1 glass of plain water
Food group	*Total number of servings in a day
Vegetable	3 servings
Fruit	2 servings
Rice, other cereals, wholegrain cereal-based products, and tubers	3 servings
Poultry/ meat/ egg	1 serving
Fish	1 serving
Legumes	1 serving
Milk & milk products	2 servings
Fats/ oils	6 servings
Sugar	1 serving

Table 1.11: Example of one day menu and *serving size of each food group for **1800 kcal**

Meal time	Example of one day menu
Breakfast	2 slices (60 g) of wholegrain bread
	1 slice of cheese
	1 glass of milk
Morning tea break	1-2 pots of plain yoghurt
Lunch	2 scoops of brown rice
	1 scoop (60 g) of stir-fried spinach with tauhu
	1 scoop (30 g) of string beans + brinjal
	1 piece of fried fish with chilli (80 g)
	1 whole medium apple
	1 glass of plain water
Afternoon tea break	4 pieces of wholegrain crackers (20 g)
	1/2 cup of boiled chickpeas (80 g)
Dinner	2 scoops of brown rice
	1 scoop (60 g) of stir-fried kangkung
	1 bowl of (250 g) of chicken soup with carrot
	1/2 whole (159 g) of guava small size
	1 glass of plain water
Food group	*Total number of servings in a day
Vegetable	3 servings
Fruit	2 servings
Rice, other cereals, wholegrain cereal-based products, and tubers	4 servings
Poultry/ meat/ egg	1 serving
Fish	1 serving
Legumes	1 serving
Milk & milk products	2 servings
Fats/ oils	8 servings
Sugar	1 serving

Table 1.12: Example of one day menu and *serving size of each food group for **2000 kcal**

Meal time	Example of one day menu
Breakfast	2 slices (60 g) of wholegrain bread
	1 slice of cheese
	1 omelette
	1 glass of milk
Morning tea break	1 pot of plain yoghurt
	1 cup whole grain wheat breakfast cereal without added sugar
Lunch	2 scoops of brown rice
	1 scoop (60 g) of stir-fried spinach with tauhu
	1 scoop (30 g) of string beans + brinjal
	1 piece of fried fish with chilli (80 g)
	1 whole medium apple
	1 glass of plain water
Afternoon tea break	4 pieces of wholegrain crackers (20 g)
	1 1/2 pieces (158 g) of stuffed tauhu
Dinner	2 scoops of brown rice
	1 scoop (60 g) of stir-fried kangkung
	1 bowl (250 g) of chicken, taukua and carrot stew
	1/2 whole (80 g) of mango medium size
	1 glass of plain water
Food group	*Total number of servings in a day
Vegetable	3 servings
Fruit	2 servings
Rice, other cereals, wholegrain cereal-based products, and tubers	5 servings
Poultry/ meat/ egg	2 serving
Fish	1 serving
Legumes	1 serving
Milk & milk products	2 servings
Fats/ oils	9 servings
Sugar	2 servings



**Focus Group Discussion on
the Key Messages, Key
Recommendations and How to
Achieve of the Malaysian Dietary
Guidelines 2020 (MDG 2020)
(5 - 7 February 2020)**

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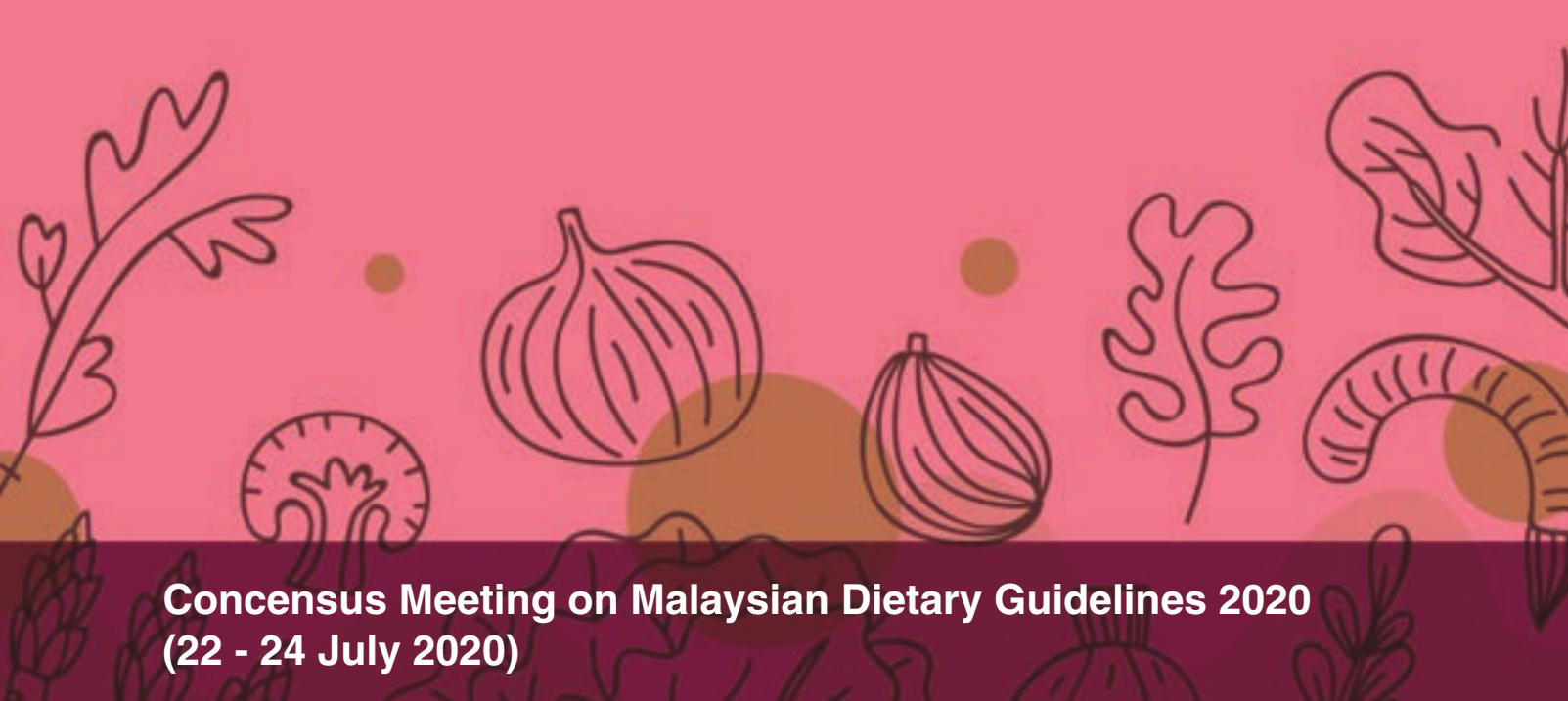
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