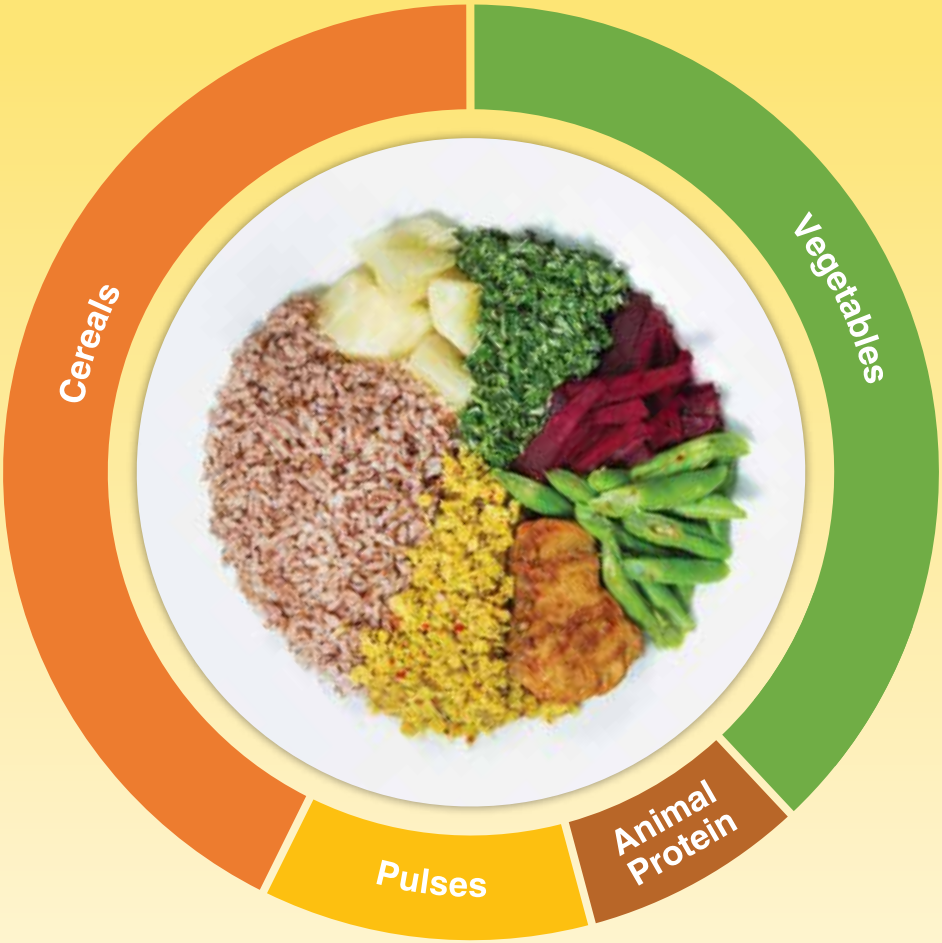
FOOD BASED DIETARY GUIDELINES

FOR SRI LANKANS

Practitioner's Handbook

Ministry of Health
Nutrition Division
2021



Model food plate for a healthy Sri Lankan adult

1. Serve half of the plate with cereals and starchy food (parboiled or less polished rice and boiled or curried yams/jack fruit/breadfruit as per preference). Some amount of carbohydrate will be provided from pulses too.

2. Fill approximately 2/3 of other half of the plate with at least 2 vegetables and one green leafy vegetable.

3. Fill the rest of the plate (1/3 of the other half) with protein sources of food. Out of which 2/3 should be from plant sources of protein and 1/3 from animal sources of protein.

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FOREWORD

Nutrition for Protection

A healthy balanced diet in correct amounts from different food groups can help to prevent diet-related illnesses and ensures health benefits. Healthy eating gives the energy and essential nutrients a person needs to keep active and maintain a healthy life. Science has evolved to focus on the importance of healthy eating patterns over time which also highlights the importance of maintaining a healthy diet. This can yield health and wellbeing in the short term and be cumulative over the years.

Dietary recommendations mentioned in this revised edition of the Food Based Dietary Guidelines (FBDG) for Sri Lankans have been compiled by professionals, which can be practically adapted by the general public.

Sri Lanka first published food-based dietary guidelines in 2002. A revised version was launched in 2011. In 2020, Nutrition Division of Ministry of Health undertook the task of reviewing and updating the Food Based Dietary Guideline (FBDG) again, incorporating evidence based latest information along with the global concept of the environmentally sustainable healthy diet. Hence, the community is given timely and appropriate guidance on healthy diet and lifestyle that is subjected to timely shifts.

This version of the Dietary Guidelines includes comprehensive knowledge on general and specific recommendations which the healthcare workers will use to direct the community on healthy food choices and correct dietary practices that will lead to the ultimate goal of a positive behavior change which will result in optimum dietary diversification. Indubitably, FBDG s developed by the Nutrition Division of the Ministry of Health will sensitize the public on healthy diet and will remarkably contribute towards achieving best nutrition standards for all.

Dr. S.H. Munasinghe,
Secretary,
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PREFACE

A healthy diet includes a variety of healthy food in recommended amounts from identified food groups. Consuming a healthy diet throughout the life-course helps to prevent a range of noncommunicable diseases (NCDs) and all forms of malnutrition as well as improved immunity. However, consumption of processed foods and changing lifestyles has led to a shift in dietary patterns. People eat more foods high in energy, fats, free sugars and salt and many people do not eat enough fruits, vegetables and other dietary fibre including whole grains. Additionally, inadequate physical activity is also a leading global risk to health.

This publication in line with the previous editions is designed to provide guidance for an average Sri Lankan on the consumption of a healthy diet. Chapters on sleep, vegetarian diet and functional food were newly added to this edition. Pictorial representations and tables were designed to make this publication reader friendly and comprehensible. Model food plate for healthy Sri Lankan adults that shows the correct proportions of food groups is one of the visually prominent illustrations.

These dietary guidelines are aimed at the general population and also include recommendations for different population groups as healthy dietary behaviours are intended to be accommodated by all, in order to achieve a better nutrition status. Moreover, the value of revised Food Based Dietary Guidelines for Sri Lankans is of paramount importance due to the rapid changes in food related behavior pattern.

These guidelines will be available to the health workers and other practitioners in all three languages highlighting fourteen key general guidelines and four age specific guidelines. We are grateful to Food and Agriculture Organization (FAO) and Nutrition Society of Sri Lanka for providing financial and technical support to review the previous guidelines as well as development and printing the revised guidelines. We like to thank all those who technically contributed to developing this guideline. The publication can be accessed via electronic platforms in official website of the nutrition division. (www. https://nutrition.health.gov.lk)

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Chapter 1
Introduction

Food and Diet

1. Gives us energy (mainly from cardohydrate and fat)

2. Helps to grow, maintain and function (mainly from protein)

3. Protect us from illnesses (mainly from vitamins, minerals, fibre)

A healthy, balanced diet is required for absence of illness and discomfort, fitness, longevity, optimal health and wellbeing.

What is food?

Food is what we eat and drink, and consists of different nutrients and non-nutritive compounds (e.g. phytochemicals, fibre) to maintain life and growth.

What are nutrients?

Nutrients are chemical compounds in food, that are used by the body to function properly and maintain health (e.g. carbohydrate, protein, fat, vitamin, minerals and water).

What is a meal?

A meal consists of several dishes of different types of food served and eaten at a time (breakfast/lunch/dinner).

What is meant by a balanced diet?

A balanced diet is the sum of food that needs to be consumed by a person throughout the day in recommended amounts, including cereals, vegetables, green leaves, fruits, pulses, fish/egg/lean meat, nuts and oily seeds to fulfill his/her energy and nutrient requirements.

What are functional food?

Functional food are consumed as part of a regular diet and have health benefits beyond the nutritional value (e.g. condiments, herbs, fruits, vegetables, nuts, seeds, grains, food containing prebiotics and probiotics). They help to protect against many diseases, when consumed as part of a balanced diet.

What is an environmentally sustainable healthy diet?

An environmentally sustainable healthy diet is a diet that has low environmental impact while contributing to the health and nutritional needs of the community (refer the glossary).

Diets recommended in this document align with the FAO/WHO guidance on sustainable healthy diets.

Processing of food:

Processing of food refers to the different processes carried out to change the original state of food for improvement of its eating quality, variety, safety or shelf life.

Unprocessed food

Food that are directly obtained from plant or animal sources and consumed without any alterations (e.g. some fresh fruits, vegetables).

Minimally processed food

Fresh food with unwanted parts removed, cut into pieces, ground, dried, boiled, roasted, chilled, frozen, fermented or pasteurized (e.g. edible. parts of plants, egg, fresh milk). When processing is minimal, food does not contain added oils, fats, sugar, salt or other substances.

Food processed with culinary ingredients

Fresh produce/minimally processed food that are seasoned or cooked as culinary preparations with oil, fats, salt, sugar and condiments in households or in restaurants (e.g. curries, prickles, salads).

Processed food

Industrially or commercially manufactured products by adding three or less ingredients such as salt, sugar, fat or other substances (e.g. preservatives, stabilizers and antioxidants) to preserve or increase palatability. They may or may not be recognized as a version of the original food (e.g. canned /bottled fruits, vegetables, pulses, fish and meat).

Ultra-processed food and beverages

They are industrial formulations made using 5 or more ingredients which are not usually used at household level. These ingredients may be those that are used in processed food (e.g. sugar, oil, fats, salt, preservatives, stabilizers and antioxidants). In addition, ultra-processed food may contain substances that are not used in processed food such as flavour enhances, colouring agents, flavours, non-sugar sweeteners, and processing aids (e.g. carbonating, firming, bulking, anticaking, emulsifying) and some derivatives extracted from food (e.g. soy protein isolate, high fructose corn syrup, invert sugar).
Some examples of ultra-processed food are sauces, sugar sweetened beverages, doughnuts, instant noodles, sausages and other processed meats.

Source - NOVA classification system (1)

The daily food requirement can be consumed as three main meals and if necessary one or two additional healthy snacks in between. A gap of around 2 - 3 hours needs to be maintained between each meal and snack.

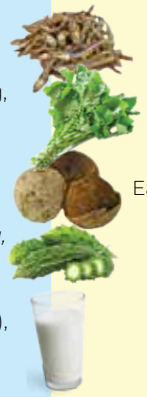
Some food we can eat;

Everyday - to get necessary nutrients

Sometimes - to satisfy ourselves

Sparingly or better to avoid

Some selected nutrients from a Sri Lankan perspective

Nutrient	Sources	Remarks
Protein	Fish, egg, meat (e.g. chicken, beef, mutton), soya bean, chickpea, cowpea, green gram, lentils, beans, wing beans, fresh milk, cheese, curd, yoghurt 	Animal proteins are high quality proteins which contain all essential amino acids. Vegetarians can consume a mixture of pulses and cereals to obtain all required amino acids.
Iron	Heam iron - Fish, meat, organ meats (e.g. liver, kidney) Non heam iron - soya bean, chickpea, cowpea, green gram, dhal, black gram, beans, banana flower (*Keselmuwa*), green leaves (e.g. *Thampala, Sarana, Gotukola, Kathurumurunga*, pumpkin leaves, beet leaves) 	Include iron rich food every day in your meal. Haem iron is readily bio-available. Non-haem iron absorption is enhanced by animal protein, and vitamin C. Add some lime juice when preparing green leaves to improve absorption of iron. Phytic acid, oxalic acid, calcium, egg yolk, tea, and coffee inhibit iron absorption.
Calcium	Sprats, small fish (e.g. sadinella), shell fish (e.g. *Kunissa*), fresh milk, cheese, curd, yoghurt, gingelly, egg, chickpea, wood apple, banana, turkey berry (*Thibbatu*), *Elabatu, Kohila* root, *Polos*, pumpkin, *Thumbakaravila*, bitter gourd *(Karavila), Anguna kola, Thampala, Kathurumurunga, Mukunuwenna, Gotukola*, knol-khol leaves, drumstick leaves (*Murunga* leaves), pumpkin leaves, radish leaves 	Eat calcium rich food daily.

Nutrient	Sources	Remarks
Vitamin D	Exposure to sunlight oily fish (e.g. tuna sp., *Salaya, Sudaya, Hurulla, Bolla*) mushrooms, red meat, egg yolk, liver, fortified food		Exposure to sunlight for 15-30 minutes between 10am to 3pm everyday may produce adequate vitamin D in the body. Try to consume vitamin D rich sources of food.
Folate	Most fruits and vegetables (e.g. *Beli*, guava, mango, papaya, beans, okra, drumsticks, banana flower, beet root, spinach), Organ meat (e.g. liver, kidney), chickpea, cowpea, soya bean, gingelly, garlic, green leafy vegetables		Eat a variety of fruits and vegetables.
Vitamin A (Pre or Pro Vitamin A)	Egg yolk, liver, kidney, fresh milk, cheese, butter, yellow, red/orange coloured vegetables and fruits (e.g. pumpkin, carrot, yellow sweet potato, tomato, *Lavalu*, mango, papaya, orange), dark green leaves		Choose a variety of vegetables and fruits in different colours (e.g. yellow, red /orange), green leaves and animal sources of food rich in vitamin A.
Vitamin B_{12}	Beef, liver, chicken, tuna sp., clams, eggs, fresh milk, cheese, curd, yoghurt		Choose a variety of food rich in Vitamin B_{12} For vegetarians try to obtain more fermented dairy products and fortified foods.

Source : Diet Modelling System to inform the revision of the Food-Based Dietary Guidelines for Sri Lankans (2)

Enjoy eating a variety of food to satisfy the daily requirement of nutrients.

FBDG 1

Chapter 2

Add colour to your daily meals balancing the correct amounts

Consume a balanced diet with a variety including cereals, vegetables, green leaves, fruits, pulses, fish/egg/lean meat, nuts and oily seeds that are essential to be taken daily in recommended amounts. A balanced diet provides necessary nutrients to prevent a range of disease conditions including all forms of malnutrition.

The six food groups that add variety to diet are:

Cereals and starchy food

Cereals and their products - for daily consumption in recommended amounts.
Cereals - e.g. rice, wheat, millet (finger millet-*Kurrakkan*, proso millet-*Meneri*, foxtail millet-*Thana haal*), maize

Cereal products - e.g. hoppers, string hoppers, *Pittu, Roti,* bread, noodles, *Chapathi, Dosai, Idly*

Starchy food - consume based on preference within recommended amounts and not necessarily as a part of daily diet.
Yams and tubers - e.g. potato, manioc, sweet potato, country potato-*Innala,* colocasia - *Kiri ala*, greater yam-*Raja ala* and other different yams

Jackfruit and breadfruit

Vegetables and Green leaves
- for daily consumption in recommended amounts.

Vitamin A rich vegetables - e.g. pumpkin, carrot, butternut squash

Other vegetables including root vegetables - e.g. beans, long beans (*Me karal*), snake gourd (*Pathola*), ridge gourd (*Wetakolu*), drumstick (*Murunga*), bitter gourd, brinjal, banana flower, capsicum (*Malumiris*), wing beans (*Dambala*), beet, radish, knol-khol, lasia (*Kohila ala*), lotus roots (*Nelum ala*)

Green leaves - e.g. *Kathurumurunga*, drumstick leaves, *Thampala, Saarana, Mukunuwenna, Gotukola, Kankun*, beet leaves, radish leaves, pumpkin leaves, spinach

Pulses / Fish / Egg / Lean meat

Pulses - for daily consumption in recommended amounts.
e.g. chickpea, cowpea, green gram, black gram, horse gram, soya and lentils

Fish / seafood / dried fish / poultry / lean meat - for daily consumption in recommended amounts. Alternate between types throughout the day/week.
e.g. all fresh and marine water fish, prawns, cuttle fish, crab, chicken, beef, pork, mutton, sprats, dried fish

Egg - for daily consumption in recommended amounts. e.g. hen/ quail/ duck egg

Fruits
- for daily consumption in recommended amounts.

e.g. banana, mango, papaya, pineapple, watermelon, guava, J*ambu, Lovi , Veralu, Uguressa, Anoda*, orange, avocado, *Beli*, wood apple

Fresh milk and its fermented products - **consume based on preference within recommended amounts and not necessarily as a part of daily diet.**

e.g. fresh milk, curd, yoghurt, cheese

Nuts, oily seeds and oil

Healthy nuts and oily seeds - for daily consumption in recommended amounts.
e.g. peanuts, cashew, *kottang*, gingelly, pumpkin seeds

Coconuts - consume based on preference in the daily diet/ throughout the week within recommended amounts.
e.g. scraped/kernel/coconut milk

Oils and fats - consume based on preference in the daily diet/ throughout the week within recommended amounts.
e.g. coconut oil, corn oil, gingelly oil, butter, ghee, fat spreads

Food consist of different nutrients (carbohydrate, protein, fat, minerals, vitamins, and water), fibre and phytochemicals which help body to function properly.

Add rainbow colours to give variety to your daily meals

How much should be consumed from each food group?

This depends on the activity level, age, physiological status and gender.

"Serving size" is a standardized amount of food that is recommended to be consumed from each food group.

The range of number of servings per day for each food group is calculated to match the energy requirement of an individual. The lowest number of servings is recommended for a sedentary woman (energy intake of 1600kcal per day) and the highest number for a very active man (energy intake of 2600kcal per day).

The recommended servings for a healthy adult

Serving sizes are given according to the main nutrient/s provided by the type of food.

Cereals & starchy food - mainly provide carbohydrate

8-13 servings a day

One serving equals to:

Cooked rice
½ cup (65 g)

String hoppers - made with rice flour
2 medium size (10 g each)

Bread
1 slice (30 g)

1/4 of a large pittu (3 cm height & 5 cm diameter)

1 hopper (25 g)

½ of a roti (about 9 cm diameter & 0.5 cm thick)

1 medium size potato (100g)

1 dosai (20-25g)

Boiled sweet potato/ manioc/ other yams/ jackfruit/ breadfruit ½ cup

Vegetables, green leaves and fruits - mainly provide vitamins and minerals

Vegetables and green leaves - 3-5 servings per day

Vitamin A rich vegetables - e.g. pumpkin, carrot, butternut squash

1 serving size = ½ cup or 3 tbsp

Other vegetables including root vegetables - e.g. beans, long beans, snake gourd, ridge gourd, drumstick, bitter gourd, brinjal, banana flower, capsicum, wing beans, tomato, cauliflower, *Amberella*, beet, radish, knol-khol, lasia, lotus roots

Green leaves - e.g. *Kathurumurunga*, drumstick leaves, *Thampala, Saarana, Mukunuwenna, Gotukola, Kankun, Anguna, Thebu*, beet leaves, radish leaves, pumpkin leaves, spinach, carrot leaves, knol-khol leaves, cabbage leaves, passion leaves, manioc leaves, tender *Kohila* leaves, onion leaves

1 serving size = ½ cup or 3 tbsp

Fruits - 2-3 servings a day

One serving equal to:

1 medium banana

1/2 small bael fruit

4 tsp raisins

1/2 cup *Anoda*

2 dates

high carb fruits

2 cups cubed papaya

1 – 2 small guava

2 slices pine apple

1 medium mango

1 small orange

1 small wood apple

1 small apple

1 medium pomegranate

5 – 10 grapes

10- 15 jambu

1 small pear

medium carb fruits

Veralu, *Lovi*, *Uguressa*, *Dan*, lemon, *Nelli*, water melon

low carb fruits no need to restrict

⅓ medium avocado (50 g) - rich in healthy fat

Pulses, fish, egg, lean meat, milk - mainly provide proteins

Pulses - 3-5 serving per day

Cooked dhal	3 tbsp
Cooked *kadala parippu*	3 tbsp
Cooked *mung parippu*	3 tbsp

Boiled chickpea	½ cup (75 g)
Boiled cowpea	½ cup (75 g)
Boiled green gram	½ cup (75 g)
Boiled soyabean	½ cup (75 g)

1 serving = ½ cup or 3 tbsp

Fish/lean meat - 2-4 servings per day

Fish	30 g
Chicken	30 g
Beef	30 g
Pork	30 g
Mutton	30 g
Dried sprats	15 g (9 – 10 sprats)
Dried fish	15 g (one match box size piece)

1 serving = 30 g (two match box size piece / 2cm x 3 cm x 4 cm)

Egg - 1 per day

1 serving = 1 egg

Fresh milk and its fermented products - 1/2-1 servings per day

One serving equals to:

Fresh milk
1 cup (200 ml)

Curd
½ cup (100 g)

Yoghurt
1 cup (100g)

Cheese
15 g

Nuts, Oily Seeds and Oils - mainly provide fat

Nuts and oily seeds

2 servings per day

One serving equals to:

1 tbsp full of peanuts
7 cashews
1 tbsp gingelly seeds (15g)

Oils - 1-3 servings per day

*1 serving = 1 tsp (about 5g)

Coconut (scrapped/kernel/milk)

3-6 servings per day

*1 serving = 1 tbsp (15g)

Tea cup = 200 ml

1 table spoon
(tbsp) = 15 ml/g

1 tea spoon
(tsp) = 5ml/g

1 match box size =
4 cm x 3 cm x 1 cm

A healthy snack may be consumed between main meals

A snack is a small amount of food taken between main meals which adds variety and can be taken one to two times per day. Eating too much unhealthy snacks can exceed the daily energy requirement and may lead to over-weight/obesity.

Select nutrient dense low-calorie healthy snacks wisely. It is advisable to leave a 2-3 hour gap between a snack and a main meal.

Avoid ultra-processed ready to eat snacks as much as possible. They are high in fat, sugar, salt and artificial food additives (e.g. colorants, preservatives and flavours).

Some examples of healthy snacks

- Whole fresh fruits – 1 medium size
- Handful of nuts or oily seeds (cashew, peanuts, kottang, pumpkin seeds, sesame)
- Boiled gram/green gram – ½ cup
- Corn on the cob – 1
- Vegetable sticks – Carrots, cucumber – ½ cup
- Yoghurt (preferably unsweetened) - 1 cup
- Dried fruits – 1 table spoon
- Popcorn (unsalted, without sugar and flavours) – 1 cup
- Herbal porridge (*Kolakenda*) – 1 glass
- Tea/coffee without sugar - 1 cup

Points to remember

- It is essential to include cereals, vegetables, green leaves, fruits, fish/egg/lean meat and nuts and oliy seeds in recommended amounts daily.
- Select a variety of food throughout the week.
- Select natural food of different flavours, textures and colours to improve taste, nutritional value and appetite.
- Make sure to consume a healthy snack, when necessary.

FBDG 2

Chapter 3

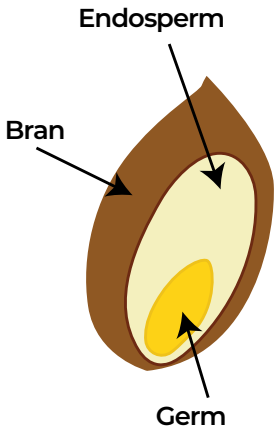
Eat whole grains and their products including less polished or parboiled rice, instead of refined grains and their products

Rice is the staple food of Sri Lankans. Other commonly used cereals are *Kurakkan*, maize, and wheat. In addition, *Meneri*, barley and oats are some other cereals that are consumed in Sri Lanka.

Cereals are the main source of carbohydrate and they contain considerable amount of protein and fibre, with a range of vitamins and minerals.

Carbohydrates should provide 55% - 65% of the daily requirement of energy. It is mainly fulfilled by cereals and other starchy food (e.g. yams, jackfruit, breadfruit). Pulses also add some carbohydrates to the diet.

Whole grains are rich in nutrients



Components of a grain

Grains contain minerals such as iron, magnesium, manganese, phosphorus, selenium as well as B vitamins and dietary fibre.

Figure shows the components of a grain of cereals which contains the endosperm, germ and bran.

Most of the vitamins, minerals and fibre in rice and other cereals are found in the outer layer (bran) of the grain. Polishing or refining these cereals leads to loss of these nutrients depending on the degree of milling.

Hence consuming whole grains and their products are more nutritious and healthy over the refined grains and their products.

Regular consumption of whole grains (unpolished or minimally polished) or their products lowers the risk of several non-communicable diseases (e.g. obesity, coronary heart disease, stroke, certain cancers and type 2 diabetes mellitus). The increased content of fibre reduces absorption of sugar and cholesterol.

e.g. whole wheat flour (atta flour) and its products (bread, pasta), *Meneri*, rolled/steel cut oats, corn, barley, *Kurakkan*.

Consume whole grains and their products

Rice available in Sri Lanka is in two forms

Raw rice 1. Raw rice (*kakulu*) 2. Parboiled (*thambapu*) rice

After harvesting rice, inedible husk is removed and raw rice is ready for consumption.

Parboiled rice

Parboiled rice is made by soaking, steaming, and drying of rice with the husk, before milling. During parboiling, water-soluble nutrients move from the bran of the rice kernel into the starchy endosperm. This minimizes the nutrient loss that occurs during the production of polished white rice.

Parboiled rice is rich in nutrients and it increases blood sugar levels at a slow and steady rate (i.e. glycaemic index*) compared to raw rice (*Kakulu*).

Both raw and parboiled varieties can be refined (polished) to different degrees. When refining grains, the bran and germ are removed to some extent, while the endosperm is retained (e.g. white rice, white bread). During this process, dietary fibre, iron and many B vitamins are lost.

* Refer the glossary

Eat parboiled or less polished rice instead of refined rice

Most of the traditional rice varieties are available as raw unpolished rice. Parboiled and traditional rice may reduce the risk of non communicable diseases due to lower glucose response (i.e. glycaemic load*). Traditional rice varieties such as *Suwendal, Pachchaperumal, Madathawalu, Heenati* varities may contain antioxidants, vitamin B and minerals, and dietary fiber.

1. Raw rice (red or white *kekulu*)

2. Parboiled rice (red or white *thambapu*)

There are several rice and other cereal based products which are also sources of energy (e.g. bread, noodles, pasta, string hoppers, hoppers, *Pittu, Roti, Kiribath, Dosai, Chapathi*). To increase the nutritional value and health benefits of refined grains/products, they can be mixed with unrefined ones (e.g. atta flour can be mixed with refined wheat flour).

* Refer the glossary

The following cereals and starchy food are the main sources of energy.

Cereals

Rice – parboiled, *Kekulu*
Traditional rice - *Suwendal, Pachchaperumal, Madathawalu, Heenati varities*
Wheat – atta flour, whole grain flour, semolina,
Corn / maize
Kurakkan, Meneri

Starchy roots, tubers and yams

Potato, manioc, sweet potato
Kiriala, Raja ala, Hulankeeriya, Buthsarana, Kidaran ala

Starchy tree crops

Boiled or cooked jackfruit, breadfruit

Preparations

Milk rice *(Kiribath)*, string hoppers, hoppers, *Pittu*, bread, *Roti*, *Dosai, Idli, Naan, Parata, Poori, Chapathi*

Traditional yams grown in Sri Lanka, (e.g. *Katuala, Rajala, Hingurala, Kukulala*) contain high amounts of carbohydrates (18% - 27%) and minerals such as potassium, magnesium, sodium, zinc and iron. These yams and tuber crops are eaten after boiling, roasting or as a curry. Starchy roots, tubers and yams have very low protein compared to cereals.

Rice and other starchy foods should be consumed in correct amounts. If taken in excess than the daily requirement, they are converted to fat and deposited under the skin and internal organs, leading to obesity, fatty liver and other non-communicable diseases.

Currently Sri Lankans consume more cereals and they contain proteins, sufficient to provide approximately 50% of the daily requirement, even though protein in rice is not of good quality. When reducing the quantity of cereals, make sure to increase the amount of good quality sources of protein in the diet.

How to serve cereals and starchy food for a person?

The number of servings of cereals and starchy food for a healthy adult is 8 – 13 servings per day*. Depending on the age, gender, activity level and physiological state, the amounts consumed should vary.

- At least a half of the cereals consumed daily should be from whole grains.
- If consuming other starchy food (e.g. bolied/curried yams, jackfruit, breadfruit) with rice, reduce the amount of rice proportionately.
- If starchy food (e.g. boiled yams/jackfruit/breadfruit) or cereal products are consumed alone in a meal, the rest of the servings of cereals per day should be adjusted accordingly.

* Refer chapter 2 for serving sizes

Points to remember

- Overweight (BMI of 25kg/m^2 or more)people need less servings of cereals and starchy food while, thin (BMI less than 18kg/m^2) people need more.
- It is important to distribute the daily recommended cereals and starchy food intake among the three main meals.
- Consume parboiled or less polished rice.
- Limit white bread and refined wheat flour preparations.
- Cereals and starchy food should fill up to half of the plate.
- Choose whole grains as much as possible.
- Cereal and starchy food should be taken in recommended amounts, with a variety of food from the other food groups that are essential to be consumed daily.
- When using more refined cereals or gains, remember to add more fibre containing food to the same meal (e.g. green leaves, vegetables or other whole grain mixtures).

FBDG 3

Chapter 4

Eat at least two vegetables, one green leafy vegetable and two fruits daily

Sri Lanka is blessed with a wide variety of fruits and vegetables throughout the year, while some are seasonal or locally available varieties. Each fruit or vegetable is different in taste, colour and texture as well as its vitamin and mineral content and some have medicinal properties.

Why is it important to increase vegetable and fruit consumption?

- Good sources of vitamins and minerals (especially high in potassium)
- Rich in antioxidants, other phytochemicals and fibre
- Low in calories
- Low in saturated fat and no cholesterol or trans fat
- Many colours ensure greater variety and diverse health benefits
- Help add variety to your meal
- Increase appetite

Are we eating enough fruits and vegetables?

Eat minimum of 400 grams of vegetables, green leaves and fruits daily.

i.e. Consume at least 5 portions of a variety of fruit and vegetables every day.

- **Eat seasonal fruits and vegetables** – nature gives us a healthy mix of nutrients.
- **Try something new -** buy fresh fruits and vegetables that are low in demand and try new recipes.
- **Let colours guide the selection of fruits and vegetables** – select fruits and vegetables of different colours : It will provide a variety of nutrients.

Some vitamins and minerals in vegetables, green leaves and fruits and their functions

Vegetables and Green Leaves

Drumstick leaves, *Kathurumurunga, Gotukola, Kankun*, radish leaves, beetroot leaves, drumstick, capsicum, bitter gourd, tomato

Fruits

Nelli, citrus fruits (orange, lemon), star fruit, guava, *Veralu,* cashew fruit, papaya, pineapple

Functions

- Helps heal cuts and wounds
- Helps in proper functioning of immune system
- Helps to keep teeth and gums healthy
- Aids in iron absorption

Vegetables and Green Leaves

Kathurumurunga, Thampala, spinach , drumstick leaves , curry leaves, colocasia leaves *(Ala kola),* carrot, yellow sweet potato *(Kaha bathala),* tomato, pumpkin

Fruits

Mango, papaya, *Lavalu*, orange

Functions

- Important for vision
- Keeps skin healthy
- Protects against infections

Vegetables and Green Leaves

Thampala, curry leaves *(Karapincha),* Okra, lima beans, spinach, beet

Fruits

Banana, pineapple, lime, *Ambarella*, orange

Functions

- Helps to form red blood cells
- Reduces the risk of developing neural tube defects

Vegetables and Green Leaves

Thampala, Sarana, Gotukola, Mukunuwenna, Kathurumurunga, Kalu-alakola, carrot and beet leaves, lotus roots,

Fruits

Dates

Functions

- Helps to form red blood cells
- Helps to maintain physical and cognitive functions

Vegetables and Green Leaves

Mushrooms, green peas, spinach, lima beans, broccoli, okra, sweet corn

Fruits

Avocado, pomegranate, guava

Functions

- Maintains cell and tissue integrity
- Improves immunity
- Important for foetal development
- Aids hormone function

Calcium

Vegetables and Green Leaves

Thibbatu, Elabatu, Polos, Kathrumurunga, Thampala, Anguna kola, curry leaves, drumstick, drumstick leaves

Fruits

Wood apple, banana,
raisins, dates

Functions

- For strong bones, teeth, nail and hair
- Aids proper functioning of nerves and muscles
- Aids clotting of blood

Fruits and vegetables are rich in antioxidants and other phytochemicals in addition to vitamins and minerals.

What are Antioxidants?

Chemical components in foods that prevent or delay cellular damage.
Protect from many illnesses - stroke, heart diseases, high blood pressure, cancer, inflammatory joint disease (arthritis), asthma and diabetes.
e.g. selenium, pro-vitamin A, vitamin C and vitamin E.

Sources of antioxidants

Allium sulphur compounds -
Leeks, onions and garlic

Anthocyanins -
Eggplant, grapes and berries

Carotenoids -
Pumpkin, mangoes, tomato, carrots, spinach and parsley

Cryptoxanthin -
Red capsicum, pumpkin and mangoes

Flavonoids -
Tea, green tea, citrus fruits, onion and apples

Indoles -
Cruciferous vegetables such as broccoli, cabbage and cauliflower

Isoflavonoids -
Soya beans, tofu, lentils, peas and fresh milk

What are phytochemicals?

Chemical compounds present in plant food that contribute to colour, taste, and smell.

They reduce the risk of many chronic diseases, including cardiovascular disease, and certain types of cancers.

The skins of fruits and vegetables are rich in phytochemicals. Therefore consume them with the skin where possible (e.g. grapes, mangoes, cucumber, pumpkins, eggplants).

Phytochemicals are degraded by processing techniques, including cooking and exposure to high temperatures. Therefore consume them raw or minimally processed where possible.

The colours in fruits and vegetables are due to different chemical compounds. Many of these compounds have health benefits when consumed as a natural fruit or vegetable in its unprocessed or minimally processed state. The greater the variety in colour, the greater the health benefit the diet provides.

Different phytochemicals in fruits and vegetables give different colours

Red	e.g. tomatoes, red onion, red pepper, pomegranate, *Lovi, Ugurassa,* watermelon, strawberries, red grapes.
Orange	e.g. pumpkin, carrots, yellow sweet potatoes, papaya, orange, mandarin.
Yellow	e.g. corn, pineapple, passionfruit, lemon, mango, starfruit

Green	e.g. spinach, green leaves, lettuce, cabbage, green beans, green pepper, okra, broccoli, green herbs (mint, coriander, basil, rosemary), avocado, local olives (*Veralu*), green tea.
Blue and Purple	e.g. beetroot, *Dandinala,* brinjals, purple cabbage, black beans, grapes, plums, *Dan, Bovitiya.*
White and Brown	e.g. onions, cauliflower, garlic, radish, mushrooms, coconut, *Rambutan,* Mangosteen, dates, nuts and seeds.

Eat at least five varieties of vegetables and fruits everyday

Dietary fibre is essential for a healthy diet.

Fibre is present only in plant food. There are two types of fibre; soluble (pectin & gums) and insoluble (lignin, cellulose, hemicellulose). Unlike other nutrients, such as fats, proteins or carbohydrates (including soluble fibre), insoluble fibre is not digested and absorbed by the human body. Instead, it passes intact through the stomach, small intestine and colon and out of the body. Although dietary fibre does not provide a significant amount of nutrients, it provides bulk to the stool and has other important health benefits.

Why fibre in the diet is important?

- Helps to regulate bowel movements - reduce constipation, irritable bowel syndrome, and bowel cancer
- Indirectly removes toxic substances in food
- Reduces absorption of cholesterol, sugar and chemical compounds
- Helps in early satiety and limits the intake of calories

Sources of fibre

- Whole-grain and its products
- Fruits
- Vegetables
- Pulses
- Nuts and seeds

Fibre is best obtained from natural food rather than from supplements, refined or processed food.

How to serve vegetables, green leaves and fruits for a person?

Consume 3-5 servings of vegetables and green leaves daily.
Eat 2-3 servings of fruits daily.

Table below shows serving sizes of vegetables, green leaves and fruits according to methods of preparation.

		1 serving equals to;
Vegetables 	Cooked vegetables (fruit and leafy vegetables)	**3 tbsp (1/2 cup)**
	Raw salads	**1 cup**
Green leaves 	Green leafy vegetables (*mallum* and salad)	**3 tbsp (1/2 cup)**
Fruits 	Medium size fruit	**1 (80-100g; banana/ orange/ mango)** **Papaya 1 piece (250 g)** **Pineapple 2 slices (100 g)** **Handful of *Lovi, Uguressa, Dan, Veralu, Nelli***
	Diced fruit/ fruit salad*	**1 cup**
	Dried fruit	**4 tsp**

*without added sugar

Eat 6 tablespoons from two different vegetables,
3 tablespoons from green leafy vegetable and 2 fruits daily

Food production has a negative environmental impact due to greenhouse gas emission, water and land use. Plant-based food have the lowest negative impact on the environment and are part of the sustainable healthy diet.

Cooking Tips

- Adding lime juice to green leaves (*Malluma*) / salads provides vitamin C for better absorption of iron.
- Overcooking vegetables destroys some vitamins.
- Adding scrapped coconut/coconut milk/oil enhances the absorption of fat soluble vitamins (vitamin A, D, E and K) in vegetables.

Points to remember

- Consume at least 400 grams of edible vegetables, green leaves and fruits daily.
- Choose fruits and vegetables of many rainbow colours to add variety.
- Always have fresh fruits in their natural form rather than juices.
- Consume locally available fruits and vegetables as much as possible.
- Eat fresh vegetables or fruits as a healthy snack.

FBDG 4

Chapter 5

Eat fish or egg or lean meat with pulses at every meal

Pulses, fish, eggs, poultry and lean meat are major sources of protein in our diet. Fresh milk and its fermented prodcuts also provide some amount of proteins to the diet. These food are also rich in vitamins and minerals.

Amino acids are the building blocks of protein. Amino acids in the protein sources of food are absorbed following digestion and necessary proteins are synthesized again in the body. However, some amino acids are not synthesized in the body and they have to be acquired from the diet. These are called essential amino acids. The human body does not store protein. Therefore, it is necessary to obtain it daily from the diet.

Protein should provide 15-20% of energy out of total energy requirement of a person per day.

Why do we need to consume protein rich food?

- Essential for the growth and repair of muscles and tissues as well as for the formation of hormones and enzymes.
- Prevention and control of infections by enhancing immunity.

Food sources of animal origin have good quality proteins with all essential amino acids. They also have iron, zinc, calcium, vitamin A and vitamin B_{12}. Especially, vitamin B_{12} is naturally found only in animal origin food, hence low consumption will lead to anaemia and neurological issues.

Plant sources of protein (pulses) lack some essential amino acids, which can be obtained by mixing with cereals.

Inadequate consumption of protein rich food leads to, poor growth and cognitive development in children and sarcopenia in adults.

Sources of proteins, their characteristics and functions*

Plant sources of protein

Pulses and beans (e.g. chickpeas, green gram, cowpea, black gram, horse gram, soya bean, dhal, beans, long beans, winged beans)

- Contain an average of 20 to 25% protein
- Do not contain some essential amino acids (e.g. methionine and cysteine)
- A mixture of cereals and pulses ensures an adequate amino acid balance, especially from vegetarian diets
- Low in saturated fat
- Contain high amount of soluble fibre
- Give additional health benefits such as reducing the risk of heart disease, diabetes and obesity
- Nutrient availability of pulses can be improved by germination (sprouting)

Animal sources of protein

Fish and other sea foods (oily fish, shell fish, dried fish and sprats)

- Rich sources of protein
- Oily fish such as anchovies (*Halmassa*), sardinella sp. (e.g. *Salaya, Hurulla*), *Kumbalawa, Bolla*, tuna sp. are good sources of essential fatty acids (especially poly unsaturated fatty acids- omega 3 and omega 6)
- Contain vitamins such as B_1, B_6, niacin, B_{12}, A and D
- Contain iron, magnesium, potassium, zinc, copper, selenium and iodine
- Small fish eaten with bones provide high levels of calcium and phosphorus
- Dried fish are rich in iodine and calcium, but may have high content of salt

*Refer chapter 2 for serving sizes

Egg

The best source of complete protein as it;

- contains all the essential amino acids in correct proportions
- better digested, absorbed and utilized by the body

Meat

Poultry (e.g. chicken, turkey, duck)
Red meat (e.g. beef, pork, lamb, mutton)

Good source of;

- high quality protein
- vitamins (A,B,D)
- minerals (e.g. iron, zinc)

Meat with less fat (lean meat) is preferred, as fat in meat is high in total fat and saturated fat.

Ultra-processed meat (e.g. sausages, ham, bacon, meatballs)

- Contains a lot of salt, saturated fat and additives including nitrates
- Limit the consumption of processed meat

Eat 3 tablespoons of pulses such as dhal, chickpeas, green gram, cowpea, soya beans at each meal.

*Refer chapter 2 for serving sizes

How to serve pulse/fish/egg/lean meat for a person?

Consume 3-5 servings of pulses daily.

Eat 2-4 servings of fish or lean meat daily. They can be consumed alternatively throughout the day or week.

Healthy adult can have an egg a day.

Can consume ½-1 servings of fresh milk (100-200ml) or its fermented products based on preference and not necessarily as a part of daily diet.

Out of daily servings of protein, ⅔ should be from plant sources of protein and ⅓ from animal sources of protein.

A healthy adult can consume one egg daily

Points to remember

- Eat a variety of pulses and mix them with cereals to acquire all essential amino acids.
- To improve the absorption of iron in pulses; add vitamin C rich food (e.g. lime, fruits) or germinate /ferment them or mix with meat, fish or poultry.
- Eat small fish with their bones to obtain calcium and phosphorus.
- Choose fish, poultry or lean meats over fatty meats and processed meats.
- Trim off all visible fat of meats and remove poultry skin before cooking.
- Children and healthy adults can have an egg daily. Others can eat egg white daily.
- Avoid cooking meat over a direct flame (e.g. grilling, barbecuing, smoking) at high temperature as it can produce poly aromatic hydrocarbons which are carcinogenic compounds.
- When a person is sick or under stress, protein requirement is higher: make sure to eat more protein during illness.

FBDG 5

Chapter 6

Have fresh milk or its fermented products

Fresh milk or its fermented products are not necessary to be a part of the daily diet. However, they can contribute to increased dietary diversity when taken on the basis of individual preference within recommended amounts .

Fresh milk is basically composed of water (87%), milk fat (3-4%) and non-fat solids (9% - protein, carbohydrate, vitamins and minerals). The fat found in fresh milk and its fermented products such as curd, yoghurt and cheese is mainly saturated. Therefore, semi skimmed or low (2%) and skimmed or non fat (0.5%) milk and its fermented products are better options. They provide vitamins; A, D, B_{12}, riboflavin and minerals; calcium, phosphorous, potassium, magnesium, selenium, and zinc, while bio-availability of calcium is about 30%.

Drink fresh milk

Fermented milk products:
During fermentation, lactose (milk sugar) is converted to lactic acid by specific bacteria.

This process;
- increases shelf life and microbiological safety of the product.
- improves digestibility of the milk.
- enhances the taste (Lactic acid in fermented products gives rise to the characteristic sour taste).

Health benefits of fermented fresh milk products

- Better tolerated by people with lactose intolerance, as lactose is converted to lactic acid
- Contain probiotics which improve gut health and are effective against diarrhoea
- Improve folate content as lactic acid producing bacteria synthesize folate

- There are evidence that fermented milk products modulate immune response, improves bone health, have anti-carcinogenic (e.g.: colo rectal cancers) and cholesterol reducing effect.

Eat fermented milk products such as curd and yoghurt

How to make fresh milk safer?

Heat treatment methods are used to reduce/eliminate harmful microorganisms in milk and make it safer for consumption.

1. Pasteurized milk

Fresh milk is heated at low temperature for a long period of time (63 ˚C for 30 minutes) or at high temperature for a short period of time (72°C for 15 seconds). Heat-labile vitamins are destroyed to some extent during this process. Pasteurization eliminates the harmful bacteria in raw milk and deactivates the enzymes that can lead to milk spoilage. Shelf life of pasteurized milk is 2-5 days and it should be stored under refrigeration. Once the container is opened, pasteurized milk should be used as early as possible.

2. Ultra High Temperature processing (UHT pasteurized milk)

Ultra-high temperature processing involves heating milk to 138–150 °C for one or two seconds and all pathogens and microorganisms are destroyed during this process. Heat-labile vitamins are also destroyed. Then milk is packaged in sterile, aseptically sealed, airtight containers. This milk can be stored for more than 6 months at room temperature and after opening, it can be kept for 2-5 days under the refrigerated conditions.

3. Sterilized milk

Fresh milk is heated to 100°C for a short time, and filled into sterilized glass bottles with an airtight seal. The bottles are passed through a steam chamber and heated to a 113–130°C for approximately for 10–12 min. The shelf life of sterilized milk is 6 months, and does not need refrigeration. Most of the B vitamins and Vitamin A are lost during this process. Once opened it can be kept for 2 – 5 days under refrigeration.

Other processed and ultra-processed milk products in the market

1. Condensed Milk	60% of water is evaporated. Sweetened condensed milk is high in calories. It contains added sugar. Regular consumption may lead to weight gain. Condensed milk is not recommended for children.
2. Drinking yoghurt/ flavoured yoghurt	Drinking yoghurt is a ready to serve drink which is prepared from yoghurt of low viscosity and contains added sugar. Flavoured yoghurts contain additives, sugar and sweeteners.
3. Flavoured Milk	Contains added sugars, flavours, colouring agents, milk powder, food additives etc.
4. Dairy ice cream	Sugars (e.g. dextrose, glucose, malto-dextran), edible fat, colouring agents, flavours and other food additives are added.
5. Butter	Is a solid, high fat food (about 80% fat), frequently used in cooking and as a spread. High in calorie and saturated fat. Therefore considered under fat and oils.
6. Ghee	Traditionally used in Asian cooking. High in total fat (more than 95%) and most of which is saturated fat. Can be used as a substitute for butter.
7. Powdered milk	Is obtained after removing water from fresh milk, semi skimmed or skimmed milk by spray drying. It contains food additives and preservatives.

Processed and ultra-processed milk products are not recommended, as they may contribute to adverse health outcomes due to their high sugar and fat content as well as presence of food additives.

How to serve fresh milk and its fermented products for a person?

Consumption of ½ to 1 cup (100-200ml) of fresh milk or its fermented products, if preferred, is adequate for a person per day. But this can be changed depending on various factors such as age, gender, health and physiological status, and dietary pattern.

Points to remember

- Unflavoured fresh milk and its fermented products are healthier options over sugar sweetened beverages (e.g. flavoured milk, fruit drinks, cordials, fizzy drinks and fruit nectars).
- Better to consume low or non fat fresh milk and its fermented products.
- Limit consumption of sweetened, coloured and flavoured milk, yogurts, yoghurt drinks, and condensed milk.
- Butter and ghee are high in fat; use sparingly.
- Some people may develop allergies to milk and milk products.

FBDG 6

Chapter 7

Eat a handful of nuts or oily seeds daily

Everyone needs moderate amounts of fat in the diet. Commonly consumed sources of fat in Sri Lanka are coconut, coconut milk, nuts, oily seeds, oils, butter, ghee and fat spreads. Nuts and oily seeds are healthier options of fat.

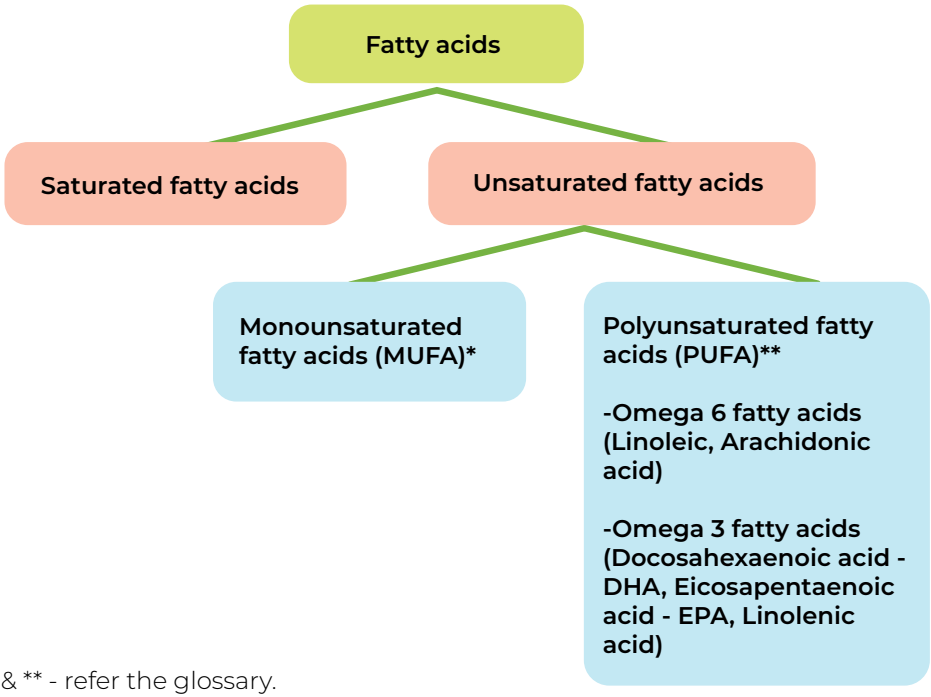
Why do we need fat in the diet?

Fat in a meal increases palatability by improving texture, flavour and taste. Fat is required for many functions in the body, as it;

- provides energy - one gram of fat provides 9 kcal of energy
- helps to absorb fat soluble vitamins (e.g. vitamin A, D, E, and K)
- provides essential fatty acids that are not synthesized in the body

Fatty acids are building blocks of fats.

There are different types of fatty acids.



* & ** - refer the glossary.

Fat should contribute 30% of the total energy requirement per person, per day. Out of that polyunsaturated (omega–6 and omega–3) fat should contribute 6–11% and saturated fat should be less than 10%. The remainder should be monounsaturated fat.

Intake of trans fat should be less than 1% of the daily energy intake.

Cholesterol intake should be less than 300 mg/day.

Consume moderate amount of fat daily. Try to replace some saturated fat with unsaturated fats.

Different types of fatty acids and their health effects

Healthy fats - to be eaten in moderation

Monounsaturated fat

Some common food sources :

- Nuts (e.g. cashew nuts, peanuts, Kottang)
- Oily seeds (e.g. gingelly, pumpkin seeds)
- Oils (e.g. gingelly, olive, canola)
- Avocado

Health effects :

- Lowers LDL (bad cholesterol) and triglycerides
- Maintains HDL (good cholesterol)

Healthy Fat

Polyunsaturated fat Omega - 3

Some common food sources :

- Oily fish (e.g. mackeral, tuna species, herrings, sardinella)
- Oils (e.g. sunflower, corn, soybean, gingelly, canola)
- Vegetables of cabbage family
- Green leafy vegetables (to a lesser extent)
- Breast milk (has an adequate amount of Docosahexaenoic acid - DHA for an infant)

Health effects :

- Lowers LDL cholesterol and triglycerides
- Maintains HDL cholesterol
- May reduce risk of coronary heart disease
- Associated with the reduction in various diseases (e.g. asthma, diabetes, skin diseases, arthritis and other auto-immune diseases)

Polyunsaturated fat Omega - 6

Some common food sources :

- Seeds (e.g. gingelly, pumpkin, kottang)
- Oils (e.g. gingelly, corn, soya beans, sunflower)
- Egg, poultry, meat

Health effects :

- Lowers LDL cholesterol and triglycerides
- Increases HDL cholesterol
- Important to maintain the correct balance between Omega 6 and 3 (4:1), for development and functioning of nervous, vascular, immune, and renal systems
- Maintaining the right balance (4:1) while keeping total fat intake to less than 30% may help to reduce the risk of cardiovascular diseases

Fat that needs to be limited

Saturated fat

Some common food sources :

- Coconut, coconut milk, coconut oil, palm oil
- Meat and meat products
- Full cream milk and dairy products
- Bakery products
- Chocolates

Health effects :

- Increases total cholesterol and LDL cholesterol
- Increases the risk of cardio vascular diseases

Cholesterol

Some common food sources :

- Animal sources of food (e.g. meat, sausages, bacon, whole milk, cheese, butter, liver)

Health effects :

- The body synthesizes cholesterol for its requirements, excess dietary saturated fat leads to elevated cholesterol
- Excess cholesterol in the body may lead to build up of plaque in arteries (atherosclerosis)

Fat that needs to be avoided

Trans Fats

Some common food sources :

- Deep fried foods (e.g. *patties, rolls, cutlets*, potato/manioc chips)
- Other bakery products (e.g. pastries, doughnuts)
- Biscuits and cakes
- Some types of fat spreads
- Chilli paste

Health effects :

- Increases LDL cholesterol
- Lowers HDL cholesterol
- Increases the risk of cardiovascular diseases

At high temperatures (e.g. deep frying, baking), a proportion of unsaturated fat is converted to trans fat. Therefore, they should not be used for deep frying or repeated frying.

Nuts such as peanuts, cashew, as well as oily seeds such as gingelly, pumpkin seeds give you healthy fat

The role of scraped coconut, coconut milk and coconut oil in the Sri Lankan diet

Scraped coconut, coconut milk, and oil are major sources of fat and one of the main ingredients in the Sri Lankan diet.
Coconut and coconut milk can be added to food to increase energy density of the diets of children, adolescents, pregnant and lactating mothers.
An average family of five can use per day;

- milk from one medium size coconut or scraped and pounded coconut from half of a medium size coconut

and

- five to fifteen (5-15) teaspoons of coconut oil.

Scraped coconut is preferred over coconut milk and oil.
Risk of formation of trans fat is minimum as coconut oil contains mostly saturated fatty acids. Therefore, it is more suitable for deep frying.

How to serve nuts, oily seeds and oils for a person?

- Consume 2 servings (2 table spoons) of nuts and oily seeds daily.
- Can add 1-3 servings (1-3 tea spoons) of oils per day as per preference.
- Can have 3-6 servings (3-6 table spoons) of coconut (scrapped/kernel/milk) per day preference.

Cooking tips

- Use pans that require less oil.
- Use a little amount of oil for tempering.
- Measure oil with a teaspoon to control the amount used.
- Minimize deep frying.
- Try boiling, broiling, toasting, grilling, baking, poaching, steaming and tempering food rather than deep frying, or baking with fat spreads.
- Do not re-use oil once used for frying, as re-heating may form cancer causing compounds and trans fatty acids.

Cooking tips

- Choose oils according to the cooking method –

  For deep frying/tempering - Coconut oil

  For salad dressing - gingelly oil, olive oil, soya oil, sunflower oil, corn oil, and canola oil

  For baking – Use butter rather than fat spreads
- Discard the skin of chicken and remove the visible fat in meat before cooking.

Points to remember

- Daily requirement of unsaturated fats can be met by consumption of cashew nuts, pea nuts, *kottang*, pumpkin seeds, gingelly and avocado.
- Consume a handful of nuts/oily seeds (approximately 30 g) daily.
- Limit consumption of ultra-processed meat (e.g., sausages, meat balls, ham).
- Avoid cakes, biscuits, short-eats, fried snacks (e.g.,potato/ manioc-chips, bite mixtures) and chocolates which have hidden saturated fat and trans fat as much as possible.
- Read the nutrition information labels on packaged food to choose food low in fat and, to avoid products high in saturated fat and trans fat.

FBDG 7

Chapter 8

Limit salty food and adding salt to food

Sodium is an element required by the body as it helps to maintain water balance, and is an important element in nerve conduction and muscle function. Sodium is naturally present in food. Salt, which is sodium chloride has been used in ancient times as an ingredient in the diet to enhance the taste as well as for preservation. However, the current salt consumption among Sri Lankans exceeds the recommended amount of less than one teaspoon of iodized salt per person per day.

Take less than one tea spoon (5 g) of iodized salt per person per day

One teaspoon of salt contains 2300 mg of sodium. It is advisable to reduce intake of sodium to **less than 2 g (less than 5 g of iodized salt)** per day for a healthy adult.

High sodium consumption and inadequate potassium intake **(the recommended amount is at least 3510mg potassium per day for adults)** is related to high blood pressure and may lead to increased risk of cardiovascular diseases.

Limit salty food

Many pre-prepared ready to eat foods including most processed and ultra-processed foods contain hidden salt.

When consuming processed food, unknowingly we take a considerable amount of salt.

Pickles, ready to eat meals, processed meats (e.g. sausages, bacon, ham, salami), cheese, stock cubes, sauces (e.g. soy sauce, ketch-up), salty snacks, instant noodles, chips, salted dry roasted nuts, some bread and processed cereal products contain high salt.

- Gradual reduction in salt intake with time would lead to low salt preference.
- Do not add salt to complementary food during the first year of life. Delay introduction of salty food to infants and young children as much as possible to avoid acquiring a preference for salt taste.

Iodized salt

- Salt available in the market is always iodized
- It is better to add salt after cooking to prevent loss of iodine due to heat

Points to remember

- Store iodized salt in dark containers. Do not wash iodized salt.
- Limit adding salt to food at the table.
- Do not add salt to rice when cooking.
- Use herbs, spices, garlic and lime/lemon juice to enhance the taste instead of salt and flavour enhances (e.g. Mono Sodium Glutamate, seasoning cubes) which are high in sodium.
- Increase the consumption of food containing potassium (e.g. fruits and vegetables), while simultaneously reducing the intake of salt (sodium). The correct potassium to sodium ratio helps to maintain healthy blood pressure levels.
- Select fresh fish, poultry and lean meat rather than salted, canned or other processed products which are high in sodium.
- Before cooking dried fish (e.g. karawala, sprats, dried prawns) wash thoroughly with water and do not add salt during cooking.
- Limit consumption of ultra-processed food and salty snacks (e.g. salted peanuts, packaged chips.)
- When buying packaged food or beverages, always check for the content of salt/sodium in the label.

FBDG 8

Chapter 9

Limit sugary drinks, biscuits, cakes, sweets and sweeteners

Consumption of sugar sweetened beverages (SSB), biscuits, cakes and other sweets promotes excess energy intake. The sugar (table sugar/sucrose) that we add to food and beverages provides empty calories which do not have other nutrients. Starchy food consumed is also converted to simple sugars in the body. Excess intake of sugar causes inflammatory diseases and other non-communicable diseases.

Limit intake of sugar: Do not exceed 25g / 6 teaspoons per person per day

Sugar sweetened beverages and sweets (e.g. cakes, confectionary) have high Glycaemic Index (GI) values. Due to their high sugar content, Glycaemic Load (GL) is also high, leading to high blood glucose level.

Some food and beverages contain 'hidden sugars' (e.g. fruit juices with no added sugar, nectar/syrups, malted drinks, caramels, corn syrups, sauces).

Why do we need to limit SSBs, confectionery and other sweets?

- Excess sugar is associated with weight gain and tooth decay.
- Weight gain in turn predisposes to other noncommunicable diseases such as diabetes and cardiovascular diseases.

Reduce the intake of calories from free sugars* to less than 10% of the daily recommended total calorie requirement. A further reduction to below 5% (roughly 25grams or 6 teaspoons) provides additional health benefits.

Limit adding sugar to food and beverages

*Refer the glossary

Sugar content in some food items according to their labels

Food Item	Approximate weight/ volume of a food item	Approximate content of sugar in tea spoon
 Milk chocolates	1 medium slab (100g)	14
 Energy drinks	1 glass (200ml)	6-7
 Sweet biscuits	100g	5-9
 Sugar sweetened milk	1 glass (200ml)	4 ½-8
 Other fizzy drinks	1 glass (200ml)	3 ½-6
 Carbonated cola drink	1 glass (200ml)	5
 Ice cream (vanilla)	100g	4 ½-5
 Fruit nectar	1 glass (200ml)	4-5
 Butter cake	1 piece (50g)	3
 Jam	1 tablespoon (15g)	1 ½-2
 Malted drinks (powdered)	1 tablespoon (15g)	1-2
 Tomato ketchup sauce	1 tablespoon (15g)	1

High fructose corn syrup (HFCS) is a sweetener derived from corn syrup and used in preparation of foods and beverages. They are associated with increased risk of non-communicable diseases such as obesity, diabetes, heart disease and cancer as well as inflammations.

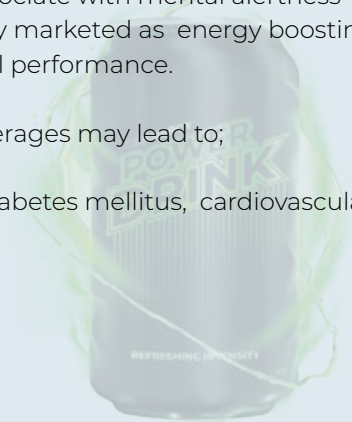
Read the labels of packaged food and beverages for the content of HFCS!!!

Non-sugar sweeteners are sugar substitutes that are often promoted as healthier substitutes for sugar. Products are promoted as sugar - free or low sugar food preparations after adding them. There are some accounts of adverse health effects of them (e.g. weight gain, cancers, diabetes mellitus, tooth decay, mood disorders). In contrast, evidence on health benefits of non-sugar sweeteners are not convincing. Therefore, it is recommended to avoid them.

Commonly used sugar substitutes in Sri Lanka are jaggery, bees' honey, treacle, and non sugar sweeteners (e.g. Stevia, Xylitol, Erythritol, Aspartame, Sorbitol, Saccharine).

Energy drinks

Energy drinks are non-alcoholic beverages that contain carbonated water, sugar or artificial sweeteners, caffeine and herbs/substances (e.g. taurine, panax ginseng root extract, L-carnitine, L-tartarate, guarana seed extract, B vitamins) which may initially associate with mental alertness and performance. Hence, they are typically marketed as energy boosting drinks which increase physical and mental performance.



Excessive and long-term use of these beverages may lead to;

- Weight gain, increased risk of type II diabetes mellitus, cardiovascular disease, dental problems.
- Risk-taking behaviors.
- Poor mental health.

Points to remember

- Consume sugar sensibly: Limit intake of sugar and food with added sugar to recommended levels.
- Enjoy natural taste of food: Minimize consumption of added sugar.
- Eat whole fruits / cut fruits rather than fruit juices / smoothies. If needed, it is better to have fresh natural fruit juices with no added sugar and salt.
- Avoid adding sugar/natural sugar alternatives to food for infants and young children.
- Adults can reduce sugar intake by reducing added sugar gradually.
- Consume healthy snacks such as fruits and vegetables instead of snacks high in sugar or added sugar substitutes.
- Read the labels of confectionery and beverages for sugar content and non sugar sweeteners.

FBDG 9

Chapter 10

Water is the healthiest drink: Drink 8 to 10 glasses (1.5 - 2.0 Litres) throughout the day

Water is accessible to all people and should be the beverage of choice. It is calorie-free. It is essential to drink water throughout the day to balance the amount of water losses through sweat, urine and faeces.

Water accounts for approximately 70% of body weight. It plays an integral role in many vital functions of our body. It is a part of blood and other body fluids and helps in excreting body wastes and maintaining body temperature.

Drink 8-10 glasses of water daily to keep your body hydrated and healthy.

The daily required amount of fluid differs from person to person.

As a general rule, the daily requirement of fluid for an adult can be calculated by dividing body weight by 30. This includes all the liquids that are taken within a day and a greater proportion of it should be water.

$$\text{Requirement of fluid (L)} = \frac{\text{Body Weight (kg)}}{30}$$

The requirement for fluid increases;

- in warm weather
- when physically active
- during pregnancy and lactation
- during fever and diarrhoeal illness

Water intake is adequate when,

- there is no feeling of thirst
- urine is light in colour

The following guide helps to ensure adequate intake of fluid for a person per day, depending on age and gender.

Age Group	Fluid Volume
 0 - 6 months	0.7 litres per day; assumed to be from breast milk
 7 - 12 months	0.8 litres per day; assume to be from breast milk and complementary food and beverages (including water)
 1 - 3 years	1.3 litres per day
 4 - 8 years	1.7 litres per day
 9 - 13 years Boys Girls	 2.4 litres per day 2.1 litres per day
 14 - 18 years Boys Girls	 3.3 litres per day 2.7 litres per day
 19 - 70+ years Men Women	 3.7 litres per day 2.7 litres per day

Source – Age and gender specific adequate intakes for water, World Health Organization, 2004 (3)

Water is preferred over other beverages

- **Water is the best drink to relieve the thirst.**
- **Water has an advantage over fruit juices, artificially sweetened soft drinks/carbonated drinks and sweetened dairy drinks as it has no calories.**

In addition to water, the following beverages can be consumed in moderation without adding sugar.

1

Herbal drinks *(e.g. Iramusu, Ranawara, Belimal, Polpala, Coriander)*

Rich in antioxidants and other phytochemicals.

2

King coconut/ coconut water

A nutritious beverage with many minerals including potassium.

3

Fresh fruit juices

Contain free sugars from fruits, which may be easily absorbed, hence it is best to have fruits in its natural form than as a drink.
Do not sieve when preparing fresh fruit juices.
Do not add sugar and salt.
Take half a glass (100 ml) at a time.

4

Tea and coffee

Contain antioxidants which have health benefits.
If you are having tea and coffee, prepare them without milk and sugar.
Considering the caffeine content in tea and/or coffee, it is better not to exceed five cups per day.
Caffeine is a stimulant, which has many negative effects above the safe limit (400mg of caffeine per day).
Avoid tea or coffee one hour before and after meals, since it interferes with iron absorption.
Excess coffee may associate with constipation.

Beverages that are best avoided

1

Sugary drinks and Fizzy drinks (Carbonated drinks)

Prepared using preservatives, artificial colours and flavours.
Should be avoided as much as possible.
Contain a lot of sugar that will lead to tooth decay, weight gain, other non communicable diseases and may reduce appetite.
May be associated with allergic conditions.

2

Alcoholic beverages

Consumption of alcohol can lead to addiction and harmful health implications (e.g. obesity, hypertension, stroke, cirrhosis, peptic ulcer, cancers in mouth, larynx, oesophagus).

Drinking water should be clean and safe

Get your drinking water from a safe water source.

Drink boiled cool water.

Avoid drinking water from plastic bottles which have been exposed to high temperatures and sun light.

Water will be injurious to health, if water gets contaminated with germs (disease causing agents like bacteria, viruses and parasites), heavy metals, chemical substances (nitrate, fluoride), hardness and salinity.

Drinking water contaminated with organisms can transmit diseases like diarrhoea, dysentery, hepatitis A and typhoid. Chlorination and boiling makes it safe.

Drinking of water, containing high amount of fluoride for a long time can result in dental problems and bone deformities. Excess fluoride in the water can be removed by reverse osmosis filtering.

Points to remember

- Drinking water should be clean and safe.
- Be sure to boil drinking water at the boiling point for 5 minutes - boiling will kill many germs.
- When traveling take your own bottle of water.
- Drinks to be taken in moderation include king coconut, herbal drinks, tea or fresh milk or fruit juices (with no added sugar).
- Patients with chronic renal disease need to follow medical advice and may need to be cautious when consuming king coconut and fruit juices which are high in potassium.

FBDG 10

Chapter 11

Be active; engage in moderate physical activity for at least 150-300 minutes per week

Regular physical activity improves overall health and reduces the risk of many health issues at all ages. Physical activity and healthy lifestyles acquired from childhood and adolescence are more likely to be maintained throughout the life span, thus imperative for the future health of all populations.

Be active
Every move counts and more is better

- **Physical activity -**
  Any bodily movement produced by skeletal muscles that requires energy expenditure (e.g. Brisk walking, dancing, lifting weights, climbing stairs, yoga and manual labour in some occupations).

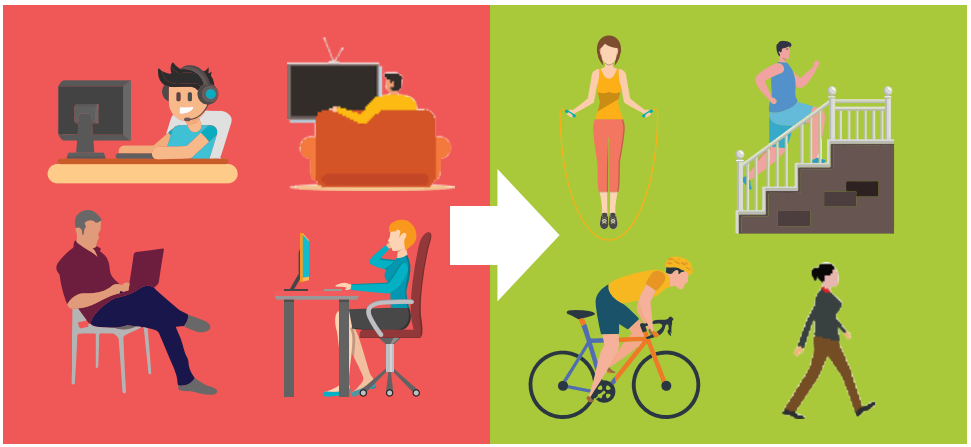
- **Sedentary behaviour -**
  Any waking behaviour characterized by an energy expenditure of 1.5 METS or lower while sitting, reclining, or lying.
  *(MET = Metabolic Equivalents of Task; 1 MET = energy cost of sitting quietly; and is equivalent to caloric consumption of 1 kcal/kg/hour)

- **Physical inactivity -**
  An insufficient physical activity level to meet present physical activity recommendations. (e.g. light-intensity activities* - standing, walking slowly, and lifting light weight objects).

- **Physical fitness :**
  A measure of the body's ability to function efficiently and effectively in work and leisure activities.

* refer the glossary

Replace sedentary behaviours with some physical activity



Why is it important to engage in physical activity?

1. Improves physical fitness, of which health related parameters are; Cardio respiratory fitness, muscle strength, muscle endurance, body composition (which includes body weight), flexibility and balance.

2. Helps to maintain healthy body weight and prevents unhealthy weight gain.

3. Reduces the risk of cardiovascular disease, stroke, Type-2 diabetes mellitus, some cancers and mental disorders at all ages.

4. Strengthens muscles, bones and reduces the risk of osteoporosis.

5. Improves balance and coordination which prevents falls.

6. Prevents disabilities and helps to reduce disabilities in people already suffering from them.

7. Enhances psychological well-being.

8. Improves learning performance, productivity and self confidence.

Most health benefits occur with at least 150 to 300 minutes a week of moderate intensity aerobic physical activities (e.g. brisk walking, cycling).

Regular physical activities, maintenance of physical fitness and nutritious diets prevent many diseases and disabilities.

*Moderate intensity physical activity

Yoga

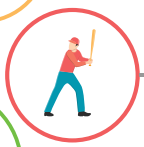
Housework and domestic chores

Brisk walking

Dancing

Gardening

Workplace activity
Carrying / moving moderate loads (< 20kg)



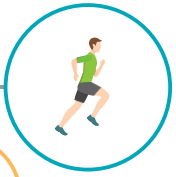
Games and sports
(with children /walking domestic animals)

Manual labour
(eg: roofing, thatching, painting)

*Refer the glossary

*Vigorous intensity physical activity

Running

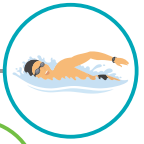


Walking / climbing briskly up a hill

Fast cycling

Aerobics

Fast swimming



Games and sports
(eg: Traditional games, Football, Volleyball, Hockey, Basketball, Badminton)

Manual labour
Heavy shoveling, digging, construction works

Workplace activity
Carrying / moving heavy loads (> 20kg)

Be active at least half an hour a day for 5 days a week.

Physical Activity Recommendations*

Moderate intensity physical activity

5 - 17 years - At least an average of 60 minutes daily across the week
18 - 64 years - At least 150-300 minutes per week
65 years and above - At least 150 - 300 minutes per week, as the functionality permits.
Pregnancy and post partum period - At least 150 minutes through out the week.

Vigorous intensity physical activity

5 - 17 years - At least 3 days a week, of aerobic activities
18 - 64 years - At least 75-150 minutes aerobic activities spread across the week
65 years and above - At least 75-150 minutes spread across the week, if the functionality permits
pregnancy and post partum period - Those who engaged in these activities/ who were physically active prior to pregnancy can continue these activities.

Muscle strengthening activities

5 - 17 years - Include as part of the 60 minutes at least 3 times/week
18 - 64 years - moderate or greater intensity activites 2 or more days a week
65 years and above - 2 days of moderate intensity muscle strengthening activities and 3 days of functional balance training activities
pregnancy and post partum period - incooporate a variety of muscle stregthening activities and add gentle stretching.

Source – WHO Guidelines on Physical Activity and Sedentary Behaviour 2020 (4)
*Refer chapter 17 for physical activity recommendations for children under 5 years

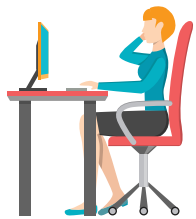
Each individual is different . Their nutritional status, lifestyle and medical history should be considered when planning an appropriate exercise programme.

Everyday

- Be active, move more
- Engage in household chores
- Carry out work manually with minimum use of machine
- Walk whenever possible
- Engage in outdoor games
- Take stairs instead of elevators/ escalators

Cut Down

- Sedentary behaviour
- Watching TV
- Playing computer/video games
- Working on computer for hours
- Sitting for long hours

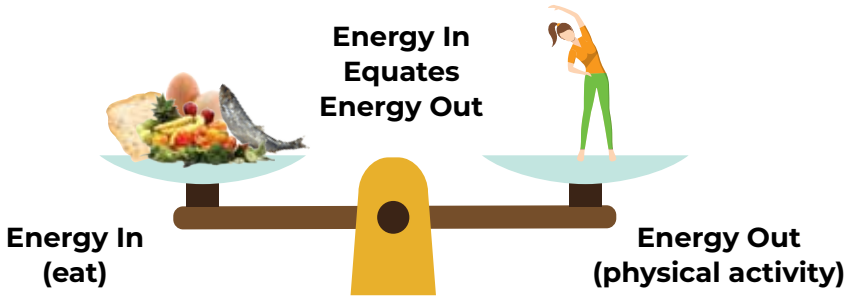


Follow the 80% diet and 20% physical activity rule to loose weight or maintaining anthropometric measurements (Body mass index* and waist circumference**).

Improving anthropometric measurements will have health benefits such as reduction of cardiovascular disease risk.

* & ** refer inner back page

Balance the amount of calories you take from the diet against the calories you burn through activity in a day.



Points to remember

- Doing some physical activity is better than none and more is better: physical activity is good for body and mind.
- All physical activity counts; Physical activity can be done as part of work, sport, leisure or transport.
- Muscle strengthening benefits everyone: It improves balance and coordination and prevents sarcopenia with increasing age.
- Do 150 to 300 minutes of moderate aerobic activity and 2 days of muscle strengthening activity per week.
- Limit time being sedentary, particularly the amount of screen time.
- Those who engage in desk jobs need to stand up and walk for five minutes every hour.
- Engage in organized group sports.
- Undertake regular physical activity throughout pregnancy and postpartum.
- Adults 65 years and above should engage in muscle strengthening, balance and coordination activities to prevent falls, in addition to other physical activity according to their ability.
- Maintain a healthy body weight and waist circumference within healthy limits.

FBDG 11

Chapter 12

Sleep 7- 8 hours continuously everyday

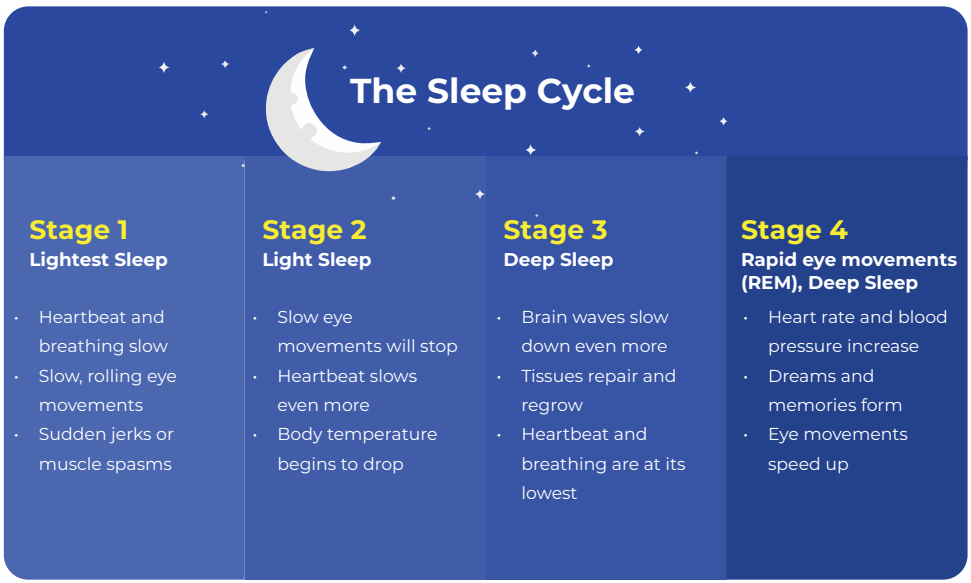
Sleep is a state where the body reduces the awareness to environmental stimuli, ensuring both physical and mental wellbeing.

Sleep;

- Improves productivity and overall quality of life
- Facilitates learning and improves new memories
- Helps to remove toxins that build up while a person is awake
- Reduces risk of injury and non communicable disease development, and improves health

Lack of sleep or poor-quality of sleep increases the risk of diseases including high blood pressure, cardiovascular disease, diabetes, obesity and depression.

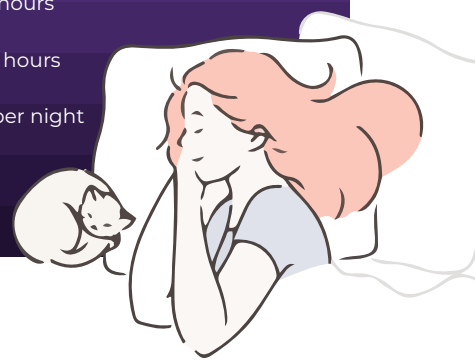
Continuous sleep for 7-8 hours per day makes you healthy



The amount of sleep required

Age group	Recommended hours of sleep per day
0-3 months	14-17 hours
4-11 months	12-16 hours per 24 hours (including naps)
12-35 months	11-14 hours per 24 hours (including naps)
36-59 months	10-13 hours per 24 hours (including naps)
5-12 years	9-11 hours per 24 hours
13-19 years	8-10 hours per 24 hours
20-60 years	7 or more hours per night
61-64 years	7-9 hours
65 years and older	7-8 hours

Source – Centre for Disease Control (CDC), 2017 (5)



Effects of diet on sleep

Tryptophan (amino acid) and Group B vitamins are needed to produce serotonin which mediates the induction of sleep.

Points to remember

- Optimize your sleep schedule and daily routines for quality sleep.
- Daily meditation and relaxation (e.g. reading a book) as a pre-bedtime routine may induce good sleep.
- Create a pleasant bedroom environment (e.g. adequate silence and darkness, comfortable temperature).
- Avoid sleeping soon after having meals.
- Switch off digital screens at least an hour before sleep.
- Avoid alcohol, smoking and caffeinated drinks in the evening.
- Have regular sleep-awake schedule.

FBDG 12

Chapter 13

Eat clean and safe food

Food must first be clean and safe for consumption. Food safety must be considered during food selection, storage and preparation in order to avoid contamination and its harmful health consequences.

How does food become unsafe?

Food may become contaminated by micro-organisms, chemical or physical agents that enter food at any point from farm to plate rendering them unsafe for consumption. Food spoilage is generally caused by biological, chemical or physical contaminants.

Types of food contaminations:

Biological contamination

- A common cause of food poisoning.
- Happens with contamination of disease-causing pathogens;
  - bacteria
  - virus
  - fungi
  - protozoa
- Major sources of contamination;
  - water
  - formites such as utensils and cloths
  - vectors such as flies, cockroaches, and rats

Chemical contamination

- Chemicals get into food during the production, storage, transport, processing, and preparation.
- Agrochemicals (e.g. pesticides, weedicides, fungicides)
- Adulterants - Harmful substances intentionally used to alter the quality of food (e.g. melamine, formalin, sugar, urea)
- Heavy metals (e.g. Cadmium, Mercury, Lead, Arsenic)
- Drug residues (e.g. Antibiotics, anti-helminthics, hormones)
- Household chemicals (e.g. Detergents, pesticides, non-safe plastics)

Physical contamination

- Physical objects or radiation that are harmful to health.
  - hair
  - fingernails
  - dirt (mud, stones)
  - pieces of glass
  - pieces of metal
  - pests or pest droppings (mice, rats and cockroaches)
  - isotopes

Some signs to identify spoiled food

1. Slimy film
2. Visible mould
3. Discoloration
4. Off texture (change of consistency)
5. Unpleasant odour or taste

Food may be unsafe even without any of the above signs.

It is necessary to take certain precautions when purchasing, storing, preparing, cooking and serving of food.

Safe purchasing and storing of food

- Purchase from clean premises.
- Look for signs of spoilage of food.
- Check expiry dates and storing conditions of packaged food and always read food labels.
- Do not purchase if the seal is broken, jars that are leaking, bulging, rusted or badly dented with a foul odour; could contain deadly *Clostridium botulinum*.
- Wash cans and bottles thoroughly with soap before opening, as they may be contaminated with rat urine and other dirt in mass storage facilities.

Fruits and vegetables

- Buy fresh seasonal products from the local markets.
- Select clean, fresh, firm and bright vegetables and fruits; avoid damaged, mouldy or shrivelled and discoloured produce.

Fish and sea food

- Eyes of fish should be clean and clear; not sunken or reddish or cloudy.
- Scales should be firm and clinging to the body.
- It should not be foul smelling.

- Gills and flesh should be bright red; not faded brick red.
- Skin should be shiny with moist appearance; without brown spots.
- Flesh should be firm and should spring back from touch.
- Frozen seafood should be hard, with no trace of oozing.

Meat and poultry

- Flesh of poultry should be white or light pink in colour; grey, purple or green on any part of the flesh shows that the product is not fresh and its unsafe to consume.
- Other meat should be bright red. If it is turning brown, this could be a lack of oxygen, freezer burn, or abnormally long storage and should not be bought.
- Fresh meat is not tender or tough.
- Keep raw fish, seafood, poultry or meat, in the freezer compartment of the refrigerator.
- During thawing in the refrigerator compartment, store them in closed containers to prevent contamination of other raw or cooked food.

Eggs

- Choose eggs with clean and intact shells.
- Refrigerate in closed containers with pointed end down.
- A spoilt egg gives an unpleasant odour.

Fresh milk and its fermented products

- Fresh milk should be free of sour taste or odour or curdles.
- Buy refrigerated pasteurized milk and store them at temperature below 5^{0}C in the refrigerator compartment.
- Do not buy yoghurt if the container lid is bloated.
- Discard yogurt/ curd if mouldy or a large quantity of liquid is on the surface or has a sour smell.

Cereals, yams, pulses, nuts and spices

- Do not purchase if infested with mould or insects, or discoloured.
- Keep cereals, pulses and condiments in dry, airtight containers away from light.
- Avoid purchasing/consuming potatoes that are sprouting and green. Green signifies the presence of a toxic glycol-alkoloid compound called solanine which is not destroyed by cooking/heat.
- Store potatoes and onions in a cool, dark place.

Safe preparation of food

Maintain personal hygiene and prepare food safely:

- Wash hands with soap and water before handling food and during food preparation.
- Clean and sanitize all surfaces and equipment used for food preparation.
- Wash cutting boards and knives thoroughly after handling raw food, especially fish, poultry and meat. Have separate cutting boards for animal products and plant products.
- Keep the kitchen and food free from insects, pests and other animals.
- Use carefully washed (with soap and running water) clean dishes and cooking utensils to store, prepare, serve and eat food.
- Keep garbage bins closed and remove the rubbish regularly.

Cooking

- Ensure the centre of frozen fish and meat are fully thawed before cooking, cook them immediately after thawing.

- Cook fish, eggs, sea food and meat thoroughly. A temperature of 70^0 C kills even high concentration of microorganism within 30 second.

- Wash eggs immediately before cooking.
- Boil fresh milk well, when directly obtained from the farm.

- Use clay or stainless steel vessels instead of aluminium to prevent reaction with acid containing food.

Safe storage of cooked food

- Cover cooked food and store them in a place above ground level.
- Promptly refrigerate all cooked and perishable food (preferably below 5ºC). In the temperature range of 5ºC to 60ºC microorganisms multiply very fast.
- Store cooked and raw food separately in the refrigerator to prevent cross-contamination.
- Keep cooked food on the top shelve of the refrigerator in a covered container.
- Do not store leftover food in the refrigerator for longer than 2 days.
- Avoid repeated freezing/refrigerating and thawing food.

Toxins in food

- Cereals, pulses, milk, spices, nuts and oily seeds may contain a toxic compound called aflatoxin that is naturally produced by moulds (fungi).
- It is chemically stable and survives even after cooking of food.
- It can cause liver cancer in humans and if the toxin load is high, may even lead to death.
- Always select food items that do not show signs of mould.

Five keys to safer food

1. Keep clean
2. Store raw and cooked food separately
3. Cook thoroughly
4. Keep food at safe temperatures
5. Use safe water and raw materials

Source: Five keys to safer food manual, World Health Organization (6)

Points to remember

- Grow fruits and vegetables organically in the home garden as much as possible.
- Do not buy damaged or cut manioc, as it may contain excess amount of free cyanide.
- A hard-cooked egg which has a green ring is safe to consume as this is a natural result of overcooking or sulphur and iron compounds in the egg reacting on the yolk's surface.
- It is best to avoid storing cooked food at room temperature for more than two hours as spoilage may begin.
- Do not store cooked food too long even in the refrigerator.
- Refrigerated food should be heated thoroughly at least at 70° C and should not be reheated more than once.
- Pasteurized or sterilized milk once opened, should be refrigerated and used within four days.
- Cans and bottles should be washed thoroughly with soap before opening, as they may be contaminated with rat urine or other contaminants in mass storage facilities.

FBDG 13

Chapter 14

Eat fresh and home cooked food: limit processed and ultra-processed food

All fresh food are unprocessed or minimally processed (refer page 3) natural produce which contain no preservatives or artificial additives.

Home-cooked meals can be prepared in a healthy manner using fresh produce, with less salt, sugar, and unhealthy fats (saturated or trans fats). Culinary ingredients (e.g. coconut milk, condiments) may be used in these meals, and be prepared in different ways according to preferences (e.g. curries, soups and broths, preserves, salads, pickles, drinks, desserts).

Always consume freshly made home cooked meals and minimally processed food and beverages. They are healthier than industrially processed or ultra-processed food and take away or out-of-home dining.

Eat home cooked food prepared with fresh produce as much as possible

Home cooked food

- Can be prepared in a healthy manner preserving maximum amount of nutrients according to preferences.
  e.g. by avoiding overcooking
  steaming or grilling rather than deep frying.
- Helps to maintain hygiene and safety of food.
  e.g. maintaining personal hygiene
  washing kitchen utensils properly
  using best practices of storing
- Can be selected to suit requirements of household members.
  e.g. known allergens, intolerance to gluten, lactose.

- Helps to control the amount of food you consume and reduce waste
  e.g. amounts of staples
  adding more vegetables and sources of proteins by purchasing only what householders eat.

Limit bottled, canned or packaged, processed or ultra-processed food

Processed and ultra-processed food are unhealthy and expensive. Unfortunately they are becoming more popular among Sri Lankans as they are mostly ready-to-eat.

Convenience food or out of home food consumption

In Sri Lanka, consuming ready to eat food from out of home food outlets (e.g. dine - in, take away) is becoming a common practice. These food often have high salt, sugar and fat content, although they may be prepared in the traditional way similar to home cooked food. They may also be prepared with poor quality produce and ingredients and, may not always be safe or nutritious. If consuming from out, consider including more fruit and vegetables and reducing the quantity of food consumed from these meals.

Industrially or commercially processed food

(refer page 3)

They can be higher in calories due to the high amounts of added sugar or fat in them.

Other than sugar, salt, oil and fats processed food may contain additives (e.g., antioxidants, preservatives and stabilizers) which are used to preserve their original properties or to resist microbial contamination or spoilage.

Consumption of processed food increases risk of chronic diseases as they contain high amounts of sodium, sugars and unhealthy fats.

Canned food may contain BPA (bisphenol A), a chemical that has been associated with health problems like heart disease and type 2 diabetes mellitus.

Contaminated canned food may also contain deadly bacteria. Bloated or expanded cans must be discarded.

Ultra-processed food

Ultra-processed products may contain;

- Salt, sugar and fat
- Dyes and other colouring agents and colour stabilizers.
- Flavours and flavour enhancers, non-sugar sweeteners.
- Processing aids (e.g., carbonating, firming, bulking and anti-bulking, de-foaming, anti-caking and glazing agents, emulsifiers and humectants).
- Extracts from foods (e.g., casein, lactose, whey and gluten)
- Derivatives from processing of food constituents (e.g., hydrogenated oils, hydrolyzed proteins, soy protein isolate, malt dextrin, invert sugar and high fructose corn syrup).

They are energy dense but with less nutrients and fibre. They contribute to overweight/obesity, cardiovascular disease, and cancer.

Examples of processed food

Processed food

- Canned or bottled vegetables, fruits and legumes
- Salted or sugared nuts and seeds
- Salted, cured, or smoked meats
- Canned fish; fruits in syrup
- Cheeses
- Unpackaged freshly made breads
- Commercially and sterilized milk
- Yoghurt

Ultra-processed food

- Carbonated drinks
- Sweet or savoury packaged snacks
- Ice-cream and frozen dessert
- Chocolate, candies (confectionery)
- Industrially produced packaged breads and buns
- Margarines and fat spreads
- Cookies (biscuits), pastries, cakes
- Breakfast cereals, cereal and energy bars
- Energy drinks
- Milk based drinks including some milk powders
- Fruit nectars
- Sugar sweetened beverages
- Sauces
- Infant formulas
- Pre-prepared pies and pasta and pizza dishes
- Poultry and fish nuggets, fish/meat balls
- Instant soups, noodles and desserts
- Seasoning powder and cubes

Points to remember

- Fresh and home cooked food are always better. Follow healthy cooking methods.
- Eating home-cooked meals regularly leads to better health.
- Prepare food with natural culinary ingredients (e.g., herb, spices, lime juice) and avoid food additives as much as possible.
- Limit consumption of ultra-processed food.

FBDG 14

Chapter 15

Always read labels of packaged food and beverages

If buying packaged food, always read the label for ingredients, nutrient values, date of expiry, and instructions for storage and preparation. The label provides information that may help determine if the product contains adequate amounts of desired nutrients or types of additives and levels of fat, salt and sugar (FSS), which helps in the selection of healthy food.

Compare different brands of the same food item to choose the better option. Be wary of claims that may not always be well supported by science.

Information on food labels helps you to make healthy choices.

The following should appear in the label

1. Common name of the product in all three languages.
2. Brand name or trade name in one or more of three languages.
3. The net content of the package should be expressed numerically in;
   - gram (g) or kilogram (kg), if it is a solid
   - millilitre (ml) or litre (L), if it is liquid
   - gram (g) or kilogram (kg), if packed in a liquid medium, net drained weight.
4. Any permitted food additives (names and INS numbers).
5. Instructions for storage.
6. Name and address of the manufacturer and distributor.
7. Batch number or the code number.
8. Date of manufacture or repacking.
9. Date of expiry.
10. Country of origin and local distributor in case of imported food.

Cut-off values for sugar content in sugar sweetened beverages (e.g. carbonated drinks, fruit nectars and juices, flavoured milk, other ready to serve beverages)

Sugar content (per 100 ml of drink)	Relative Sugar Level	Colour Code
More than 8g	High sugar	Red
2.5g to 8g	Medium sugar	Amber
Less than 2.5g	Low sugar	Green

Source: Food regulations 2019 under the Food Act - Colour coding for sugar levels in beverages (7)

Colour coding system for fat, salt and sugar in solid and semi-solid food

Every solid or semi-solid processed food should bear the colour code to show the content of **fat, salt and sugar (FSS)** in relation to the recommendations for daily intake.

These logos should be displayed in the main panel of the package.

Food high in sugar, salt and fat - Red logo

Food with medium sugar, salt and fat - Amber logo

Food with low sugar, salt and fat - Green logo

Cut-off values for FSS content in the colour coding system for solid and semi - solid food		Sugar level (in 100g of food)	Salt level (in 100g of food)	Fat level (in 100g of food)
	Red	>22g	>1.25g	>17.5g
	Amber	5-22g	0.25-1.25g	3-17.5g
	Green	<5g	<0.25g	<3g

Source: Food regulations 2019 under the Food Act - Colour coding for sugar, salt and fat in semi-solid food (8)

Food additives

An additive is a substance that is not usually consumed as a food nor a common ingredient of food. The term does not include contaminants, common salt and substances added to food for maintaining or improving nutritional quality.

Food additives are substances used as food colouring, flavouring and flavour enhancers, sweeteners, preservatives and antioxidants.

Commonly used sweeteners in Sri Lanka

Name	INS number	Common food items
Sorbitol	420	Desserts and similar products, jams and jellies, breakfast cereal, confectionaries, sauces, fine bakery products, non - alcoholic drinks, energy drinks, ice-cream, water based flavoured drinks, fruit juice-based drinks, milk and milk derivative-based preparations, snacks: ready to eat, prepacked, dry, savoury and coated nuts
Acesulfame K	950	
Aspartame	951	
Isomalt	953	
Sucralose	955	
Steviol glycoside	960	
Neotame	961	
Lactitol	966	
Xylitol	967	
Erythritol	968	

Some commonly used food additives in Sri Lanka

		Name	INS number	Common food items
Preservatives		Sulphites and sulphur dioxide	E220-228	Sausages, canned meat, jams
		Nitrite and nitrate	E249, E250	Cured meat (sausages, ham, bacon)
		Sorbic acid	E200	Beverages (some dairy products), fish and sea food, baked food and cookies
		Benzoic acid	E210	Energy drinks
		Propionic acid	E280	Bakery products
Flavour enhancers		Monosodium glutamate	E621	Instant noodles, pizza, tomato sauces, soup cubes, fast food seasoning powders/cubes, potato chips, crackers, processed meat, yeast extract
		Disodium 5' – guanylate	E627	
		Disodium 5' – inosinate	E631	
Colourings	Red	Carmoisine Ponseau 4R	E122 E124	Fruit juices, cakes and desserts, fizzy drinks, ice-creams
	Yellow	Sunset yellow FCF Tartrazine	E110 E102	
	Blue	Indigotine Brilliant Blue FCF	E132 E133	
	Green	Fast Green FCF	E143	

Source: Food Additive Index, Codex Alimentaries Commission (9)

Any genetically modified food or any food containing ingredients from genetically modified organisms should not be injurious to health and should not be imported or sold without permission from the chief food authority of Sri Lanka. However, the label or package should mention the presence of genetically modified food or ingredient.

FBDG 15

Chapter 16

Consume more pulses, sprats, small fish, egg, meat as well as fruits and vegetables during pregnancy and lactation

Optimal nutrition prior to and during pregnancy plays a key role in baby's growth and development, preventing intergenerational malnutrition. Poor nutritional status of women in reproductive age may increase the risk of adverse pregnancy outcome, when they conceive. Well-balanced diet with adequate nutrients helps to meet the extra demands during pregnancy and lactation.

- Optimize nutritional status during the reproductive period to break the vicious cycle of malnutrition.
- It is important to follow packages for newly married couples and the inter-pregnancy care package from the Ministry of Health.
- Ensure a normal pre-pregnancy BMI, as it has a profound influence on the outcome of pregnancy.
- Start taking folic acid supplements (400 micrograms) at least three months before conception.
- Encourage to receive professional health care according to the national maternal care guidelines throughout pregnancy and post-partum period.

Appropriate weight gain during pregnancy is very important.

- Pre-pregnancy body mass index (BMI) and the number of foetuses affect in weight gain during pregnancy.
- Appropriate weight gain helps to improve birth weight of the baby.

- Inadequate weight gain may lead to low birth weight and affects the baby adversely.

- Excessive weight gain during pregnancy could lead to adverse pregnancy outcomes (gestational diabetes, gestational hypertension, low/high birth weight).

- Weight reduction during pregnancy should not be planned.

Guidelines on weight gain in pregnancy

BMI (kg/m2)		Expected weight gain in kg
Underweight	<18.5	12.5-18
Normal	18.5-24.9	11.5-16
Overweight	25-29.9	7.0-11.5
Obese	>/= 30	< 6.8

Source - Maternal care package - A Guide to Field Healthcare Workers, Sri Lanka, 2011 (10)

Make sure to include food from all food groups in recommended servings throughout pregnancy and lactation.

The nutritional needs increase as the pregnancy progresses and peaks during 3rd trimester. The required amount of food varies according to the pre-pregnancy BMI and the level of physical activity.

If a woman with normal BMI is pregnant with a single foetus, the approximate number of extra calories needed each day to maintain a healthy pregnancy, is 340kcal during the 2nd trimester and 452kcal during the 3rd trimester.

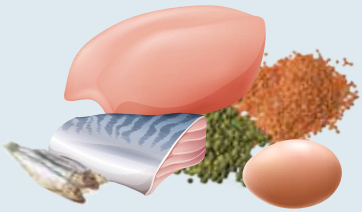
- Eat pulses, small fish such as sprats, egg, or lean meat in daily meals to increase protein intake. Germination of pulses increases the bio-availability of iron and other nutrients.

- Add vegetables, green leaves, fruits and whole grains to daily meals as they provide the required vitamins, minerals and fibre.

- Consume sprats, pasteurised fresh milk and its fermented products and green leaves (e.g. *Kathurumurunga*, drumstick leaves, *Thampala*), with daily meals, which are good sources of calcium.

Recommended number of servings from each food group during pregnancy - 1900kcal for a sedentary and 2500kcal for very active women.

Cereals and starchy food
(8-10 servings)



Pulses (3 servings);
Fish/ lean meat (3-5 servings)
An egg (1 serving)

Vegetables and
green leaves (4-5 servings)

Fruits
(3-4 servings)

Fresh milk and its fermented
products (½ - 1 servings)

Nuts, oil seeds and
oils (2 servings)

Appropriate and timely nutrition supplementation as per the recommendations of Ministry of Health guidelines is important for good nutrition in mother and baby.

Nutrition supplementation for fulfilment of additionally required nutrients during pregnancy and lactation as per the Ministry of Health guidelines.

Thriposha (Food supplementation)

Provides important macro (carbohydrate and protein) and micronutrients, in addition to the diet consumed.

- Recommended to take 50g (three table spoons) per day.

Folate

Helps to prevent neural tube defects in the foetus.
Supplementation of folic acid 400 micrograms per day is recommended by the Ministry of Health since planning a pregnancy. It should be continued throughout the pregnancy.

Iron

Needed in increased amounts for;

- Increased red cell production in mother
- Growth of: uterus, placenta, and foetus
- Iron requirement starts increasing at the beginning of the second trimester and reaches a peak in late pregnancy. Daily iron supplmentation of 30 mg elemental iron for a non-anaemic pregnant woman, and 120 mg elemental iron for an anaemic pregnant woman is recommended by the Ministry of Health.
- Avoid drinking tea or coffee with meals or within 1 hour after meals for better iron absorption.
- To avoid side effects (e.g. nausea, metallic taste) iron supplements should be taken immediately after a meal. Adverse effects of iron supplements could be reduced if taken at bedtime, or with fruit juice.
- Continue Iron supplements for six months after delivery to replenish the stores and to prevent iron deficiency anaemia.

Calcium

Needed for foetal growth and helps to maintain the bone mass of the mother.

- Calcium requirement is increased during pregnancy and throughout lactation.
- Calcium supplementation of 600 mg after 12 weeks of pregnancy and 300 mg during the first six months of lactation is recommended by the Ministry of Health.

Vitamin C

Enhances the absorption of iron and reduces the risk of infections.

- Vitamin C supplement of 100 mg with iron supplementation is recommended by the Ministry of Health.

Engage in physical activity as appropriate during pregnancy and lactation.

- Healthy women should engage in at least 150 minutes of moderate-intensity physical activity throughout the week.
- Incorporate a variety of muscle strengthening activity and gentle stretching.

Morning sickness

Morning sickness is characterized by nausea and occasional vomiting, which is common in early pregnancy and related to hormonal changes.

The following may help to reduce morning sickness.

- Take a light meal, before getting out of bed in the morning.

- Eat small, frequent meals. Dry light snack, dry toast, or dry cereals are preferred.

- Avoid stomach being empty by evading food, or being too full by eating large meals.

- Drink some water time to time before thirst kicks in.

- Avoid odours or tastes that trigger vomiting.

- Excessive vomiting requires medical attention.

Healthy eating while breast-feeding (lactation)

Breastfeeding protects baby from infections and allergies, while helping mother to reduce the risk of developing breast and ovarian cancers.

- The mother needs extra 450 calories during exclusive breast-feeding period and 550 calories during the second six months of breast feeding.
- Breast milk is rich in calcium. Therefore, the mother should continue taking calcium rich food.
- Take adequate fluids to stay well hydrated (3.0L of liquids per day).

- Breast milk production itself demands a lot of energy. Hence deposited fats are utilized by the body and may help to get back to a normal weight.

- It is essential to establish proper breastfeeding technique. Always seek medical advice if there is any difficulty.

- Take adequate rest.

- Mother must take a diverse diet to obtain all required nutrients. A diverse diet also helps to prime the baby with different tastes as food flavours pass to the baby via breast milk.

- There is no advantage in taking special nutritional supplements such as milk powder that are marketed claiming special benefits to the mother and baby.

FBDG 16

Chapter 17

Exclusively breastfeed infants till completion of 6 months of age and continue age-appropriate breastfeeding along with appropriate complementary food up to 2 years of age and beyond

Breast milk is the best, safest and nutritionally most appropriate food for the new born baby. Breastfeeding should be initiated within one hour of birth and the baby should be breastfed on demand.

Colostrum - thick, yellowish milk secreted in small amounts by the mother during initial few days after childbirth.

- Colostrum is essential and totally adequate for the new born.
- Rich in nutrients and helps to protect the baby from infections.
- All of it should be given to the child.

Continue exclusive breastfeeding for the first 6 months!!

- The volume and nutrient composition of breast milk is adequate for an infant to grow optimally till 6 months of age.
- Breast milk also provides adequate amounts of water to the baby during the period of exclusive breastfeeding. Therefore, the baby does not require additional water during this period.
- The baby should be breastfed on demand during the exclusive breastfeeding period.
- Exclusive breastfeeding till 6 months helps to prevent infections, non-communicable diseases and allergies in the baby.
- During exclusive breastfeeding, babies generally do not need additional vitamins or minerals. Iron and other micronutrient supplements are recommended for premature and low birth weight babies as per the Ministry of Health guidelines.

- During illness continue to breastfeed with increased frequency to maintain adequate nutrition to the baby to hasten recovery and prevent growth faltering.

- Regular growth monitoring is needed to ensure adequate growth. If faltering occurs, specially during the period of exclussive breastfeeding, seek medical advice.

Benefits of breastfeeding

To the baby

1. Provides all required nutrients needed for optimum growth and development.
2. Easily digested and absorbed.
3. Clean and ready to use at any time
4. Protects against infections. (e.g. diarrhoea,respiratory tract infections, ear infections).
5. Promotes cognitive development/ Intelligence Quotient (IQ).
6. Prevents constipation.
7. Leads to bonding between baby and mother.
8. Prevents allergies (e.g. asthma and eczema) later in life.
9. Prevents non-communicable diseases (e.g. obesity, diabetes mellitus) later in life.

To mother and family

1. Reduces the risk of developing breast cancer and ovarian cancer in mother.
2. Protects against diabetes mellitus.
3. Helps to reduce weight in mother.
4. Economically beneficial.

Working mother

- Mothers are recommended to express and safely store breast milk which can be used to feed to the baby during her absence by the caregiver.
- Expressed breast milk can be kept in a clean covered container for 4 - 6 hours at room temperature and for 24 hours in the refrigerator non-freezer compartment.
- Do not boil the expressed breast milk before feeding.
- Expressed breast milk should be fed with a cup or a cup and spoon.
- Training the mother and the caregiver should start well ahead, at least 4 weeks before going back to work. The third postpartum home visit by the public health midwife (PHM) is a good opportunity to train/support the mother to express breast milk.
- If the mother has to be away at work for long periods and is faced with difficulty in expressing and storing breast milk, still she may not need to start infant formula. Complementary feeding can be started at the completion of 4 months after seeking medical advice.

Breastfeeding should be continued age appropriately along with safe, nutritious and appropriate complementary food up to 2 years of age or beyond.

Introduce complementary food by completion of 6 months

After completion of 6 months (180 days) of age, mother's milk alone cannot provide the increasing demand of energy and nutrients for the growing baby. Therefore, additional food to complement the breast milk need to be introduced to meet this increased requirement while continuing to breastfeed as appropriate for age.

Timely introduction of complementary feeding would help to;

- train children to eat food with different tastes and consistency, and teach them to munch food, thereby getting them accustomed to eat family food by one year of age.
- train children to eat on their own on reaching two years of age, by stimulating their feeding skills appropriate to their development.
- inculcate healthy food habits from the very beginning of life.

Complementary food should be;

Timely - introduced at the age when the need for energy and nutrients exceeds what can be provided through exclusive breastfeeding and continued thereafter with age appropriate frequency, quantity, consistency and variety.

Adequate - provide sufficient energy, protein and micronutrients to meet a growing child's nutritional needs.

Safe - hygienically stored and prepared, and fed with clean hands using clean utensils. Do not use bottles and teats.

Properly fed - consistency of food, quantity and meal frequency should be appropriate for the age of the child and given considering hunger and satiety cues. Adopt feeding techniques to suit the age and development of the child.

Guide to correct complementary feeding.

1. **Rice is the best food to begin with.**
   It should be mashed and be of semisolid consistency. The consistency should be gradually increased. Pulses, food of animal origin (e.g. fish/meat), vegetables, green leaves and fruits should be added gradually to the daily diet. One new food item at a time (e.g. pulses, fish, meat, vegetables, green leaves and fruits) should be added every 2-3 days to the daily diet.

2. **Introduce food of animal origin and pulses (preferably germinated) early.**
   Fish, sprats, poultry, meat, liver, which are rich sources of haem iron should be introduced within one week of introducing complementary feeding. Include green gram, cowpea,chickpea, soya in the daily diet. (these provide non-haem iron which is not well absorbed as haem iron).

3. **Add one or more food items such as egg yolk, pumpkin, yellow sweet potato, carrot, papaya, mango, dark green leaves and liver**, which are rich sources of Vitamin A.

4. **Include locally available fruits daily.**
   Fruits should be given in the mashed or pulped form initially and not in the form of juices.

5. **Give food with adequate amount of fats.**
   Add coconut milk or coconut oil when cooking food or fat spreads or butter to the cooked food. This makes food softer, palatable, tastier and energy dense as well as facilitates absorption of fat soluble vitamins.

6. **Eggs are a cheap source of good quality protein and can be given daily.**
   Eggs, a very nutritious food can be added to the baby's diet around 2 weeks after introducing complementary food, starting with egg yolk. Give well cooked eggs (either boiled or fried until firm). Egg white can be introduced a few days after introducing egg yolk.

7. **For a breastfed child other milk/milk based products are not necessary. For a non breastfed child fresh milk can be given after one year/ and its fermented products (e.g.curd, unsweetened yoghurt) can be given as snacks from seventh month onwards.**
   These should be given without adding sugar, treacle, jaggary or honey.

8. **Give locally available, low cost nutritious food (rich in energy, proteins, vitamins and minerals) than ultra-processed, packeted food.**

9. **Do not add sugar or salt in the preparation of food during the first year.**
   Most of the natural food contain adequate amounts of salt and sugar. Taste for added salt and sugar is acquired and should not be encouraged even after first year.

10. **Avoid** small, rounded, hard pieces of food, whole nuts, pulses which can lead to choking.

11. Ensure variety in every meal.

12. **Avoid blending complementary food.** Consistency of complementary food should be gradually increased from well mashed at the very beginning to normal adult food by one year of age.

13. **Start feeding with cup and spoon and later switch to fingers according to the consistency of food.**

14. **Encourage self-feeding. Introduce finger food around 8 - 9 months.**

15. **At one year of age a child should be given a nutritious family diet.**

Preparation of germinated pulses:

Nutrient availability of pulses can be improved by germination (sprouting);

- Select whole, unbroken pulses (mung, cowpea, ulundu)
- Soak pulses in water until sprouting takes place (48 hours)
- Dry in sun and roast lightly on low flame
- Powder by hand pounding or in an electric grinder
- Store in a wide mouthed screw cap bottle
- Add one teaspoonful powder to the rice during preparation of the feed

Prepare food safely

Contamination of food with pathogens causing diarrhoea is one of the problems associated with complementary feeding;

Practice good hygiene and proper food handling techniques.

Wash hands with soap and water before preparing food and feeding.

Wash the child's hands before feeding.

Store cooked food well covered until use.

Serve food without delay after preparation.

Use clean utensils to prepare and serve food.

Use clean cups, bowls and spoons to feed the child. Do not use these utensils for any other purposes.

Avoid the use of feeding bottles and teats.

Points for sustaining breastfeeding along with complementary food;

- The frequency of breastfeeds becomes less with age due to, increase in sleep time at night and increasing intake of complementary food during day time.
- Breastfeed the baby after a meal and not before, to make the baby adequately hungry for the meal.
- From the latter part of the first year, the baby should not be woken up to feed at night. After the first year, breastfeeding 2-3 times a day after meals would be sufficient.
- Milk and dairy products are not indicated if the baby is breastfed. In addition, formula milk poses health risks to the baby.

Number of servings per day from different types of food for children aged 6 months to 5 years

Food group	6+ – 8 months	9-11 months	1+-2 years	2+-5 years
 Cereals and starchy food	2-3	3-4	3-4	4 or more
 Vegetables	1	1-2	2	2
 Green leaves	1	1	1	1
 Lentils, pulses, nuts	1	1	1-2	1-2
 Fish, meat and egg	1	1-2	1-2	2
 Fruits	1	1-2	2	2
 Breast milk	After meals as desired	After meals as desired	2-3 times per day after meals	2-3 times per day after meals
 Milk products (e.g. curd, yoghurt, cheese) **not essential for a breastfed baby**	½-1	1	1	1-2
 In case of formula fed children	500-600ml	500-600ml	2 cups (400ml)	2 cups (400ml/d)
 Fat based food	1 tsp/meal	1-2 tsp/meal	Small amount	Small amount
 Confectionary (Not to be encouraged even after the first year)	Should not be given	Should not be given	A small amount after mealtime	A small amount after mealtime
 Salt	Should not be given	Should not be given	Use sparingly	Use sparingly

Give infants water after each meal and whenever they are thirsty using a cup.

Recommendations on texture, frequency and amounts of meals according to age categories (for analysing dietary recalls in clinical practice and giving feeding advice to parents and caregivers).

Age in months	Texture	Frequency	Amount of food for an average child at each main meal
6+ - 8	Start with well mashed rice. Continue adding pulses, fish/sprats/ chicken/ meat, vegetables, green leafy vegetables, egg yolk etc. Continue changing the consistency of food from finely mashed to coarsely mashed.	2-3 main meals per day plus breastfeeds and depending on child's appetite 1-2 snacks a day (a snack between two main meals). Allow adequate time between two meals for the baby to get hungry.	Start with 2-3 tea spoons full per feed and increase gradually up to a bit more than a half a 200ml tea cup at each meal.
9 - 11	Coarsely chopped or mashed foods and foods baby can pick up (finger foods).	3-4 main meals plus breastfeeds after meals. Depending on child's appetite 1-2 snacks a day in between main meals. Allow adequate time between two meals for the baby to get hungry.	About ¾ of a tea cup at each meal.
12 - 23	Family foods (chopped or mashed coarsely if necessary).	3-4 main meals plus 2 – 3 breastfeeds per day after meals. Depending on child's appetite 1-2 snacks a day in between main meals. Allow adequate time between two meals to let the baby get hungry.	One full tea cup or a bit more at each meal .
> 23	Nutritious family food.	3-4 main meals and one to two snacks a day (a snack between two main meals). 2 – 3 breast feeds per day after meals.	More than one full tea cup for each main meal and gradually increase with age.

How to assess the adequacy of a baby's meal

- The best way to assess the adequacy of a baby's meal is by monitoring the growth.

- Monitoring of growth involves regular weighing and measuring the length (till 2 years of age) or height (after two years of age) at recommended intervals and then plotting them in the standard growth charts (provided in the Child Health and Development Record).

- Detecting early deviations of growth especially in the weight for age chart enables early correction of underlying causes on time (e.g. short comings in the feeding pattern, underlying illnesses).

Physical activity, sedentary behaviour and sleep in children under 5

Physical inactivity is a leading risk factor for childhood obesity and global mortality. Early childhood is a period in which habits are formed. Daily physical activity across a 24-hour period plays an important part. A typical 24-hour day is made up of sleep time, sedentary time and physical activity of varied intensity ranging from light, moderate or vigorous intensity.

It is important to have adequate amounts of daily sleep and restricted sedentary screen time. Apart from engaging in moderate to vigorous physical activity daily, most of the time of the day children should be active. Recommended daily physical activity, sedentary time and sleep time according to ages are given below.

Recommended daily physical activity, sedentary and sleep time according to age

Age	Physical activity	Sedentary time	Sleep time
<1 year **<3 mo** **<4-12 mo**	At least 30 min tummy time	Screen time* is not recommended. Not to be restrained# for more than 1 hrs at a time	14 -17 hrs 12 – 16 hrs
12 - 23 months **24 - 35 months**	At least 180 min in variety of types of physical activities	Screen time is not recommended. Sedentary screen time should be no more than 1 hour.	11 -14 hrs**
3 - 5 years	At least 180 min various types of physical activity At least 60 min to be moderate to vigorous intensity.	No more than 60 min	10 – 13 hrs**

*Watching TV, videos, smart phones, tablet devices or playing computer games
On to prams/ strollers, high chairs, or strapped on a caregiver's back
** With regular sleep and wake time at appropriate ages

- Give a variety of nutritious food in quantities and frequencies appropriate for age.
- Practice responsive feeding from the very beginning. Try to feed the young children at same time as other members of the family have their meals.
- Wait till the child is adequately hungry before giving meals. Avoid frequent feeding as it reduces the appetite. Regularize meal times.
- Do not reduce food during illness. Children need more food when they are ill.

FBDG 17

Chapter 18

Children and adolescents need more fish or egg or lean meat with pulses, and vegetables and fruits

Optimizing nutrition throughout the childhood supports continued and steady growth. Adolescence as a transitional period with rapid physical and psychosocial development is the last window of opportunity to improve growth, and prepare for a healthy productive life. Through proper nutrition during childhood and adolescence, school performance could be improved and risk for development of many non-communicable diseases in adulthood could also be reduced.

Children and adolescents need a nutrient dense diet

- They need a lot of energy, protein, calcium and iron to facilitate the rapid growth of bones and muscles during puberty.
- They have to consume more animal proteins with pulses or legumes at each meal.
- Girls need more iron rich food than boys as they begin to menstruate.
- High intake of calcium and Vitamin D rich food is important to achieve high bone mineral density and prevent osteoporosis at the old age.
- Small fish including sprats are good sources of Calcium. They also can have one glass of fresh milk or 2 servings of its fermented products to achieve their calcium needs.
- Exposure to sunlight between 10am to 3pm for 15 minutes is adequate to prevent vitamin D deficiency.

Number of Servings for food groups recommended for children 6 – 10 years old (1400 kcal – 1900 kcal).

Food	Servings per day
 Cereals and starchy food	6 - 8
 Vegetables and green leaves	3
 Pulses	2 - 3
 Fish, lean meat	2 - 3
 Egg	1
 Fruits	2 - 3
 Fresh milk and its fermented products	1 - 1 ½
 Nuts and oily seeds	1
 Oils	1 - 2
 Coconut, scraped/milk	3 - 6

Number of servings of each food group recommended for adolescents (11 – 18 year old). Based on 2000 kcal - 3400 kcal energy requirement for 11-18 year old adolescents.

Food	Servings per day
 Cereals and starchy food	11 - 18
 Vegetables and green leaves	4-5
 Pulses	3 - 4
 Fish, lean meat	3 - 5
 Egg	1
 Fruits	2 - 4
 Fresh milk and its fermented products	1 - 2*
 Nuts and oily seeds	1 - 3
 Oils	2 - 4
 Coconut, scraped/milk	3 - 6

*It is better to consume more calcium (e.g. sprats, green leaves) and protein sources to meet daily needs.

Growth assessment of children and adolescents

- Growth is assessed using height and BMI for age.
- Cut off levels depend on age and sex.
- For interpretation of BMI it is recommended to use sex specific growth charts for age available in the Child Health Development Record (CHDR)

Reference standards of BMI for 5-19-years children and adolescents:

- Low BMI = < - 2SD BMI for age and sex
- Overweight = > +1SD to +2SD BMI for age and sex
- Obese = > + 2SD BMI for age and sex

Nutrition problems in children and adolescents

- Inadequate food intake will lead to;
  - poor physical fitness and mental performance
  - reduced learning ability
  - increased susceptibility to recurrent infections and loss of body shape
  - reduced bone density

Maintain healthy food habits with diversified diet including cereals, vegetables, green leaves, pulses, fish, egg, lean meat, fruits, nuts and oily seeds in recommended amounts

- Do not skip meals as it could lead to under-nutrition.
- Eat recommended amounts of vegetables and fruits to get required micronutrients and antioxidants. Lack of anti-oxidants in the diet may cause cancers in adulthood and may reduce brain function in old age.
- Overeating will result in loss of body shape, joint problems, psychological distress and early onset of non-communicable diseases (e.g. Type 2 diabetes, high blood pressure, coronary heart disease, stroke, gall bladder disease, osteoarthritis, sleep apnoea, respiratory problems).

- Avoid wrong food choices with high starch, sugar, salt and fat (e.g. bakery food with unhealthy fats, fizzy drinks, savoury, deep fried food, short-eats and crispy chips) as they would lead to obesity. These are known as junk food as they provide high calories with inadequate micronutrients.

- Increased consumption of excess fat, alcohol, charred/ smoked & salted/ nitrate cured meat (e.g. sausages, ham and bacon) and other processed food would increase cancer risk (e.g. colon, breast, oesophagus, endometrium (womb) and kidney).

Healthy dietary behaviours and regular physical activity acquired during childhood and adolescence, are more likely to be maintained throughout the lifespan.

FBDG 18

Chapter 19

The elderly needs more fish, eggs, lean meat or pulses, and vegetables and fruits

Persons aged 60 years and above are considered as older persons or elderly, and those who are 80 years and above are recognized as oldest old.

As a person gets old, physiological changes (e.g. reduction in senses of taste and smell, difficulties in digestion and absorption, reduction of metabolic rate and reduced energy requirement) would lead to poor nutritional status. Further more, poor dietary diversity and eating problems may aggravate malnutrition.

Eating a well-balanced diet helps to stay healthy and active.

Eating issues in elderly

Loss of taste

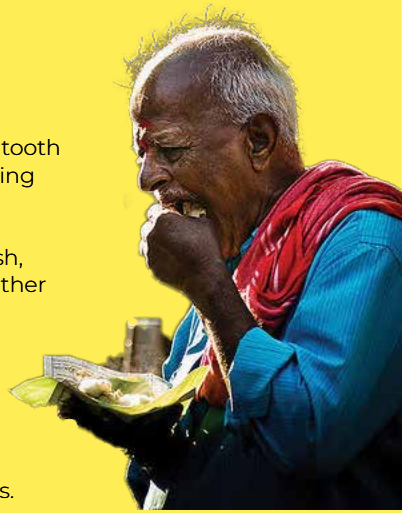
Underlying reasons / causes

- Gradual loss of tastes buds and reduced saliva
- Long term smoking and beetle chewing
- Respiratory conditions like common cold

Possible solutions

- Maintain cleanliness of mouth.
- Give local remedies like '*Thambum Hodi*'/ '*Rasam*' to improve appetite.
- Use lemon juice, vinegar, spices or herbs, rather than oil or salt to boost the flavour.
- Change cooking methods and use variety of food.
- Consult a doctor and get medical advice.

Difficulty in chewing



Underlying reasons / causes

- Dental problems occurring due to age (e.g. tooth decay, broken and missing teeth, poorly fitting dentures, dry mouth, mouth sores)
- Other age-related conditions (e.g. oral thrush, fractured jaw, pain in jaw joint, stroke and other chronic illnesses)

Possible solutions

- Eat softer food or cut them into small pieces.
- Change consistency of food from solid to semi solid or fluid.
- Boil/ steam / grind some solid food to make easier to chew.
- Slowly chew as much as possible before swallowing.
- Do not replace main meal with tea, coffee or soft drinks as they do not provide adequate nutrition.
- Add some solid particles to the meal as an entirely liquid diet can make the muscles in the gut shrink.
- Correct loose-fitting dentures and replace missing teeth.
- Get medical advises from a dental surgeon/doctor.

Dry mouth

Underlying reasons / causes

- Reduced saliva secretion
- Medication
- Dehydration

Possible solutions

- Drink plenty of liquids during the day.
- Clean/ rinse the mouth frequently.
- Seek medical advice to change medication.

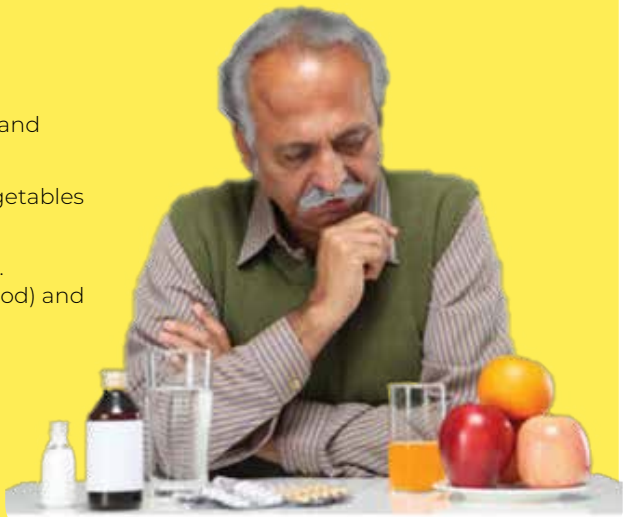
Reduced appetite

Underlying reasons / causes

- Underlying disease status
- Medications
- Loss of taste
- Sedentary behaviour
- Feeling full

Possible solutions

- Vary the shape, colour, and texture of food.
- Variety of fruits and vegetables increases appetite.
- Try new food items (e.g. vegetables, fruits, seafood) and recipes.
- Be active.
- Seek medical advice.



Choking on food

Underlying reasons / causes

- Coughing/ talking while eating.
- Drinking too fast.

Possible solutions

- Mindful eating. (e.g., Avoid watching television or talking or doing other activities while eating).
- Avoid liquids while eating.
- Eat slowly. Do not eat while lying down.
- Eat in the presence of someone.

Feeling unhappy

Underlying reasons / causes

- Social isolation
- Poor income and social support
- Sedentary behaviour

Possible solutions

- Participate in social or spiritual gatherings and activities.
- Engage in social eating. Enjoy meals with family members or friends.
- Open up and talk about problems with someone reliable.
- Engage in physical activities.
- Seek medical advice.

Constipation

Underlying reasons / causes

- Underlying disease condition
- Medications
- Psychosocial issues
- Poor consumption of fruits and vegetables
- Inadequate water intake
- Sedentary behaviour

Possible solutions

- Drink adequate amounts of fluid.
- Increase intake of food rich in fibre.
- Engage in physical activity
- May need extra fibre supplements.
- Schedule toileting after meals
- Seek medical advice.

Remember

- Eat more fish, eggs, and lean meat to maintain muscle mass.
- Consume more fruits and vegetables to improve appetite and reduce constipation.
- Elderly may feel only salty taste due to reduction of taste buds with age. Therefore, limit salt only with doctors' recommendations.
- Dehydration is a common problem among elderly and water is the best source to preserve hydration.
- Be active: Daily physical activity improves appetite, mood, sleep, flexibility and balance.
- Minimize being sedentary for extended periods.
- Choose household activities: gardening, playing with family / grandchildren, recreational activities, walking, (e.g. recreational or to gather provisions/ medicines from local store)
- Choose appropriate physical activity to suit the level of fitness.
- Consult a doctor to identify the appropriate types and amounts of physical activity.

Chapter 20

Vegetarian diet

A well-planned vegetarian diet including a variety of plant-based food from different food groups can meet the daily nutritional needs of a person. A diet based on whole grains, vegetables, pulses, fruits, nuts and oil seeds when taken in recommended amounts helps to reduce the risk of heart disease, diabetes, obesity and certain types of cancers. However nutrient deficiencies (e.g. vitamin B_{12}, B_2, D, calcium, zinc, iron, iodine) may be observed among vegetarians, as some nutrients in plant food are less absorbable. These deficiencies can be avoided by consuming a variety of food in recommended amounts in daily.

Vegan dietary practices are not recommended for children.

Vegetarian diet should be planned carefully

Types of Vegetarian Diets

Vegan

Restricted to only plant food.

Lacto-vegetarian

Includes milk and milk products (e.g. curd, yoghurt, butter, cheese) in addition to plant food.

Excludes meat, fish, poultry and eggs.

Ovo-vegetarian

Includes eggs in addition to plant food. Excludes meat, poultry, sea food and dairy products.

Ovo-lacto vegetarian

Includes milk, milk products and eggs in addition to plant foods.

Excludes meat, fish and poultry.

Semi-vegetarian

Mainly plant based diet.
May includes fish/egg/poultry, milk and milk products occasionally or in small quantities.

Vegetarians may be at risk of;

- Calcium deficiency – which may lead to osteoporosis in later life. It would be caused by low intake of calcium and vitamin D rich food sources (e.g. sprats, milk and milk products) and reduced absorption of dietary calcium due to high contents of phytates, fibre and oxalates in plant-based diet.
- Impaired immunity due to nutrient deficiency (e.g. zinc, vitamin B_{12}, vitamin D).
- Anaemia and peripheral neuropathies (numbness of fingers and toes) due to iron, vitamin B_{12} deficiencies.
- Diminished growth and development of children due to nutrient deficiencies (e.g. protein, iron, calcium, vitamin D).

How to ensure nutrition adequacy among vegetarians?

1

Protien

- Eat a variety of plant sources of proteins (e.g. pulses, beans, nuts).
- Consume whole grain cereals combined with pulses (chickpea, cowpea, green gram).
- Soy beans and soya products (e.g. tofu) provide complete proteins.

2

Iron

- Add vitamin C rich fresh vegetables (e.g. tomato, cabbage, broccoli) to your diet.
- Add some lime to the green leaves.
- Consume orange, papaya, *Nelli*, guava, lime or lemon soon after the meal.

3

Calcium

- Add calcium rich dark green leaves (e.g. *Kathurumurunga, Thampala, Anguna kola*), soya beans, tofu, sesame and wood apple.

4

Zinc

- Consume whole grains, legumes and nuts to add zinc to the diet.

5

Vitamin D

- Expose to sunlight for 15-30 min from 10 am to 3 pm.
- Mushroom is a good source of Vitamin D.

6

Vitamin B_{12}

- Consumption of fermented products improves microbiota which synthesize Vitamin B_{12} in human intestine.
- Add vit B_{12} fortified food or supplements with medical advices.

7

Vitamin B_2

- Lacto-vegetarians can get vit B_2 by consuming fresh milk, yogourt, cheese.
- Vegans can have nuts and green vegitables to get vit B_2 .

8

Omega 3 fatty acids

- Include plant sources of omega 3 in the meal (e.g. soybean oil, gingelly oil, green leaves, avocado).

Health benefits of plant-based diet

Plant based diet lowers the risk of non-communicable diseases (e.g. cancers, obesity heart diseases, stroke, diabetes mellitus)

- Lowers the LDL cholesterol in blood.
- Decreases cholesterol absorption from the diet and increases excretion of dietary cholesterol.
- Reduces the risk of development of cancers due to fibre, antioxidant and phytochemicals.
- Lowers the amount of food consumed leading to control over-weight and obesity.

Fibre content in plant-based diet also prevent constipation due to bulkiness.

Today there is global attention on achieving environmentally sustainable diets in addition to ensuring that diets are healthy. Food production is associated with generation of greenhouse gas emission, water consumption and contamination, deforestation and land use. Plant based diets contribute to a lesser negative environmental impact compared to the production of animal sources of food.

Remember

- Eat a mixture of cereals and pulses, and consume nuts to meet protein requirement.
- Fermentation or germination of pulses improves the bioavailability of nutrients.
- Have variety of fruits and vegetables.
- Fruits rich in vitamin C help to absorb non-haem iron.
- Add some lime to the green leaves.
- Choose unsalted nuts as a snack or use them in salads.
- Add calcium rich plant food to daily diet.
- Exposure to sunlight for 15-30 minutes between 10 am to 3 pm to improve vitamin D levels.

Chapter 21

Functional Food

Functional food

Functional food is a "food with physiological benefits and/or reduce the risk of chronic diseases beyond basic nutritional functions, and may be similar in appearance to conventional food and consumed as part of a regular diet".

Food is considered functional when they contain biologically active compounds such as nutrients (vitamins, minerals, proteins, omega 3 fatty acids) or pro-vitamin A, dietary fibre (e.g. inulin, fructo-oligosaccharides), plant sterols, (e.g. phytoestrogens in soya) organosulfur compounds, poly acetylene compounds, phenolic compounds, prebiotics/probiotics.

Functional food is in usual diet in the form of unprocessed/minimally processed/processed with culinary ingredients or fermented.

Examples of functional food

- **Fruits:** e.g. bananas, oranges, *Nelli***,** berries (e.g**.** *Dan, Uguressa, Mora, Himbutu, Palu, Weera, Ambilla, Karamba, Eraminiya),* grapes, pears, wood-apple, *Beli*, apple

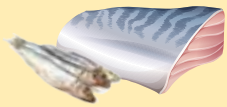
- **Vegetables**: e.g. biter gourd, *Thibbatu*, cauliflower, snake gourd, ridge gourd, pumpkin, peppers, cabbage, tomato, beans, wing bean, broccoli

- **Green leaves**: e.g. *Gotukola*, drumstick leaves, *Kathurumurunga, Anguna, Kovakka, Thebu*, leafy cabbage, spinach

- **Nuts**: e.g. peanuts, cashews, kottan, almonds

- **Seeds**: e.g. sesame, pumpkin seeds, kasakasa, chia seed

- **Pulses**: e.g. chickpeas, green gram, cowpea, black gram, lentils, kidney beans, horse gram



- **Seafood**: e.g. tuna sp. salmon, sardines, anchovies, mackerel, cod, crab, shrimp

- **Fermented food**: "traditional *Diyabath*", hoppers (fermented rice flour), *Dosai, Idli* (made out of fermented black gram), tofu, soya sauce, curd, yoghurt, paneer, *Jardi*, vegetable pickle

- **Condiments**: e.g. turmeric, cinnamon, ginger, garlic, pepper, curry leaves, coriander leaves, fennel, cumin, fenugreek, garcinia, tamarind

- **Beverages**: e.g. *Iramusu, Ranawara, Belimal*, coffee, green tea, black tea, *Kola kanda*

Fermented food

Fermentation is the process of converting sugars and starch to alcohol or organic acids using good bacteria, fungi or enzymes under anaerobic conditions. Fermentation gives variety to food.

Prebiotics and probiotics in fermented food

Probiotics are live bacteria found in certain foods (e.g., curd, yoghurt) which are similar to the gut flora and have health benefits when consume in adequate amounts.

Prebiotics are types of non-digestible substances that help gut-friendly bacteria to grow (e.g. garlic, onion, shallots, leeks and legumes).

Eating balanced amounts of prebiotics and probiotics can help to have right balance of bacteria to keep microbiota/gut flora healthy (11).

Functional food are associated with several potential benefits.

- High in vitamins and minerals
- Add a variety of functional food to protect against diseases.

Rich in antioxidants which neutralize harmful compounds known as free radicals

- Prevent cell damage in certain chronic conditions (e.g. heart disease, cancer, diabetes, obesity).

High in omega-3 fatty acids

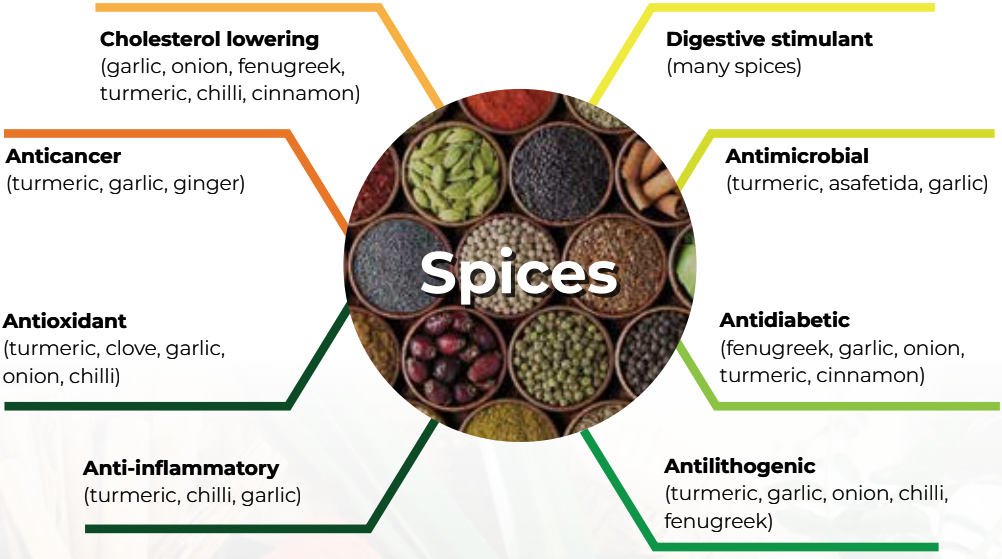
- Reduce inflammation, boost brain function, promote cardio vascular health.

Rich in fibre, prebiotics and probiotics

- Prevent digestive disorders (e.g. diverticulitis, stomach ulcers, haemorrhoids, acid reflux)

A blend of aromatic spices is used to enhance the flavour in Sri Lankan traditional dishes. The essential oils from spices and condiments enhance smell and taste which stimulate appetite and salivation to improve the digestion process.

Some health effects of spices that are widely used in traditional Sri Lankan food



Source: Traditional Indian Functional Foods, Central Food Technological Research Institute (12)

GLOSSARY

Environmentally sustainable diet

Sustainable healthy diets are dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable.

Glycaemic Index (GI)

The glycaemic index (GI) assigns a numeric score to a food, to measure the blood sugar rising potential. Foods are ranked on a scale of 0 to 100, with pure glucose (sugar) given a value of 100. Lower the glycaemic index of a food, slower blood sugar rises after consuming that food. In general, the more processed a food is, the higher its GI, and the more fiber or fat in a food, the lower it's GI (13).

Carbohydrate-containing foods can be classified as high- (≥70), moderate- (56-69), or low (<55) GI relative to pure glucose (GI=100).

Glycaemic Load (GL)

Blood glucose levels is dependent on both the nature (GI) of the carbohydrate it contains and the amount you eat (i.e. the grams of carbohydrates).
Glycemic load takes both of these factors into account and is calculated by multiplying the GI of the food by the amount of carbohydrate per serve and then divided by 100.

$$\text{Glycaemic load} = \frac{(\text{GI} \times \text{amount of avialble carbohydrate per serving})}{100}$$

For a typical serving of a food, GL would be considered high with GL≥20, intermediate with GL of 11-19, and low with GL≤10 (13).

Monounsaturated fats

Monounsaturated fats are fat molecules that have one unsaturated carbon double bond in the molecule (14).

Polyunsaturated fats

Polyunsaturated fats are fat molecules that have more than one unsaturated carbon double bond in the molecule.

These unsaturated fats are healthy fats.

Free sugars

Free sugars are all monosaccharides and disaccharaides added to food by the manufacturer, cook or consumer, plus the sugars that are naturally present in honey, syrups and fruit juices.

These do not include the sugars present in whole fruits and vegetables as they are digested more slowly and a take longer time to enter the blood stream.

Metabolic Equivalent of Task (MET)

Metabolic equivalent of task (MET) is a physiological measure that expresses the intensity of physical activities.

One MET is the energy expended by an individual while seated at rest.

Light-intensity physical activity

Activities performed with energy cost less than 3 times the energy expenditure at rest for that person (1.5- 3 METs). It does not result in a substantial increase in heart rate or breathing rate.
e.g. slow walking, bathing, household chores, other incidental activities.

Moderate-intensity physical activity

Physical activity performed between 3 and less than 6 times the intensity of the resting energy expenditure (3-6 METs). It results in increase in heart rate or breathing rate.

On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0–10.
e.g. brisk walking, slow to moderate cycling, water aerobic

Vigorous intensity physical activity

Physical activity performed at 6 times or more the intensity of the resting energy expenditure (>6 METs). It results in substantial increase in heart rate or breathing rate.

On a scale relative to an individual's personal capacity, Vigorous intensity physical activity is usually a 7 or 8 on a scale of 0–10.
e.g. running, heavy lifting of weights, skipping with a rope, fast swimming

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Healthy body weight - An age and height appropriate body weight, defined by Body Mass Index (BMI)

$$\text{BMI } (kgm^{-2}) = \frac{\text{Weight (kg)}}{\text{Height x Height } (m^2)}$$

This formula is recommended for use in children and adolescents too. However, it should be compared with an age and gender specific BMI charts, which are available in the Child Health Development Record (CHDR).

Interpretation of BMI among adults

< 18.5	Underweight	Increase the energy intake from a balanced diet and engage in with regular moderate physical activity, predominantly muscle strengthening exercises.
18.5 – 24.9 **23 - 24.9**	Normal Point of actions for NCDs	Continue a balanced diet and engage in regular moderate to vigorous physical activity and muscle strengthening exercises.
25 – 29.9	Overweight	Reduce energy intake from food with moderate to vigorous intensity aerobic physical activity targeting weight reduction, and muscle strengthening exercises.
>30	Obese	Reduce energy intake from food with moderate to vigorous aerobic physical activity targeting weight reduction, and muscle strengthening exercises.

In case of obesity, it is necessary to follow clinical guidelines.

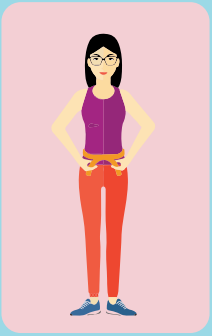
Waist circumference

It is an approximate index of superficial and intra-abdominal fat mass and total body fat.

Waist circumference - WC - Men < 90cm (36")
Female < 80cm (32")

Also waist circumference to height ratio
[WC(cm)/Height(cm)] less than 0.5 is a health level

Higher values are associated with increased risk of cardiovascular and other forms of chronic diseases.



An overall healthy and balanced diet is the best strategy to achieve good health and to prevent illnesses.

Healthy Life Through Proper Nutrition