Food Based Dietary GUIDELINES *for* SRI LANKANS

A Publication by

Nutrition Division - Ministry of Health

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FOREWARD

Consumption of appropriate foods in proper amounts provides the basis for healthy eating. It is well established that food based approaches provide sustainable solutions to many nutritional problems. This has been highlighted at many international fora and there was a general consensus that all developing countries should adopt a food based dietary guidelines suitable for the country.

From the point of view of the public, it is pertinent that the recommendations made by the professionals are practically translated into day-to-day practice and this guide is an attempt to provide the General Public with solutions that they can easily follow.

The First edition of food based dietary guidelines was developed and published in 2002 and it is an appropriate time that a review and update was carried out as the food patterns and life style of the people is subjected to a constant change over time. Latest evidence and scientific principles have been taken into account in updating this publication, so that the community is given the latest information and advice on the diet they should take.

It is my fervent hope that the grass-root level health workers will make use of this publication to advice the community on the correct dietary practice. Imparting proper knowledge will go a long way in inculcating good practices in the community. A positive behavior change which will result in adequate diversification should be our ultimate goal.

It is important that this publication is launched in connection with the national nutrition month 2011 which is an event organised with the objective of sensitising the public on nutrition issues. I have no doubt that FBDG developed by the Nutrition Division of the Ministry of Health will contribute towards achieving a better nutrition status for our people.

Dr. T.R.C. Ruberu
Secretary
Ministry of Health

PREFACE

In the effort of overall development of the country and its people, nutrition status plays a vital role as it affects health, well being and productivity. Achieving optimum nutrition status is rested in many sectors and agencies so that only a coordinated and collective programme of work will reap the benefits of our efforts.

It is important that the dietary advice is delivered to the general public in a manner they can understand and apply in day-to-day life. The recommendations made should suit the busy life style and the socio-economic status of our people. Therefore the advice given should be simple and doable in the actual setup.

Nutrition Division of Ministry of Health under took the task of reviewing and updating the Food Based Dietary Guideline (FBDG) incorporating latest information and scientific principles and at the same time making it simple and easy-to-read document.

It is widely accepted that encouraging dietary diversification is a corner-stone in achieving optimum nutrition in any country and food-based approaches remain a tool to achieve this objective. All attempts have been made to encourage consumption of local, home based foods and religious and cultural sentiments have been taken into account. Moreover, the food policy of the government has been given the due recognition.

This publication is designed to provide guidance for an average Sri Lankan on the consumption of a healthy diet. Certain chapters are dedicated to special groups or food groups where specific emphasis and recommendations are required. It is expected the community change their behavior using these guidelines in order to achieve a better nutrition status. In an environment where the proportion of elderly individuals is on the increase and the high prevalence of non-communicable diseases threatening to be a major health problem, the value of publication of FBDG is increasingly felt.

These guidelines will be made available to the health workers and general public in all three languages and simpler messages will be developed for the use of media targeting the general public. The grass-root level health and nutrition workers may make use of these tools effectively in the effort of improving health and wellbeing of all Sri Lankans.

Dr. U.M.M.Samaranayake
Director / Nutrition
Ministry of Health

01 Eat a variety of food every day

Eating is one of the joys of life. Consider how the right balance of food and activity helps you to keep your body weight under control. Do not completely give up the foods you really enjoy for the sake of your health. Instead, aim for variety and moderation. Take pleasure in foods with different flavours, odours, texture and colours. Be creative!

How do you select a healthy diet?

There are six food groups that provide you energy and nutrients to keep you healthy. Each food group gives you different nutrients needed by your body. You need to eat a **variety** of food every day, in **recommended quantities** to form a **healthy diet.**

The food groups are:

1 ***Grains (cereals) and tubers (yams)***

Rice, wheat, *kurakkan*, maize (corn), rice & wheat flour preparations (bread, string hoppers etc.)
Tubers (yams)- manioc, potato and sweet potato, *innala*, *kiri ala*
Starchy fruits- jak, breadfruit

- Provides energy for your daily activities.

2 ***Fruits***

Plantain, mango, papaya, pineapple, oranges, guava, avocado etc.

- protects you from diseases

3 ***Vegetables***

Leafy vegetables - *kankun*, spinach, *gotukola*, *mukunuwenna*, *sarana*, *katuru-murunga*, *drumstick murunga* leaves etc.
Root and fruit vegetables - gourds, brinjals, ash plantains, ladies fingers, tomato, carrot, beet etc.

- protects you from diseases

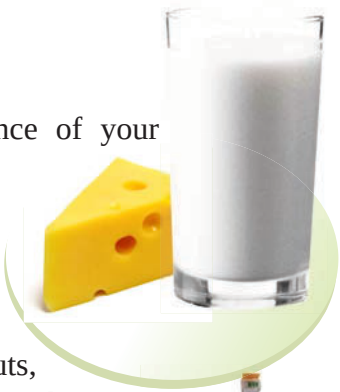
4 ***Fish, pulses, meat and egg***

Fish - fresh water fish & sea fish, sprats, dried fish, shell fish (prawns, cuttle fish)
Pulses - Chick pea *(kadala)*, green gram, cowpea, soy bean, *ulundu*, lentil (dhal),other beans
Meats - chicken, beef, pork, mutton, Offal- liver
Eggs - hen's, duck, quail (*vatu*)

- helps in growth and maintenance of your body

5 ***Milkan d or milkp od cts***
Milk,c urd,yogh urt,c heese

- Helps in growth and maintenance of your bones and teeth



6 ***Nuts andoi l seeds***
coconut, pea nuts, kottang, cashew nuts, pumpkin seeds, coconut milk, coconut oil, gingelly and palm oils,other vegetable oils, butter, margarine, ghee

- Provides energy helps in bodily functions

The Golden rule: Be sure to eat some **food from each of these groups daily**. It is important to include some item (s) from each group rather than a large quantity of one or two groups. This will ensure variety in your diet and thereby give you the nutrients required by your body every day.

How much of each food group should be consumed?

The number of servings needed each day from each of the six food groups depends on the age, sex, body size, level of activity, and the stage of the lifecycle. Illnesses impose additional considerations.

Eat more of some food (grains, fruits and vegetables) and less of others (fats and oils). The food pyramid, a graphical presentation which guides you of the quantity you need to take from each food group **(annexI)**.

What are serving sizes?

It helps you understand how much food is recommended every day from each of the six food groups. It is assessed using household measures.

Examples,
1 tea cup of cooked rice (200 ml cup) equals 1 serving
1 slice of bread (a loaf cut into 9 equal slices) equals 1 serving.
30 grams of cooked fish equal 1 serving.

The recommended number of servings from each food group and the description of serving sizes are given in ***box 1 and 2***

Box 1
Recommended number of daily servings from each food group

Food group	No. of servings
Rice, bread, other cereals and yams	**6 - 11**
Fruits	**2-3**
Vegetables	**3 - 5**
Milk and / or milk products	**1-2**
Fish, pulses, meat and eggs	**3 - 4**
Nuts and oil seed	**2-4**

Box 2
Serving Sizes

1 cup = 200 ml tea cup

Cereals & starchy foods	
Cooked rice	1 cup (130-140 g)
Bread	1 slice (50 g)
Vegetables	
Cooked vegetables *(fruit veg. & leafy veg.)*	3 tbsp (½ cup)
Raw salads	1 cup (200 ml)
Fruits	
Medium size fruit	1 (1 banana / 1 orange)
Cut fruit / fruit salad	½ cup
Dried fruits	2 tbsp (20-30) g
Fish, pulses, dried fish, egg, poultry and meat	
Cooked fish/ poultry/ meat	30 g
Cooked pulses	3 tbsp
Eggs	1
Dried fish	15 g
Milk & dairy products	
Milk	1 cup (200 ml)
Yogurt/ curd	1 cup (100 ml)
Milk powder	30 g (2 tbsp)
Nuts & oil seeds	1 tbsp (15 g)

Cooked items : quantities measured without gravy

Role of Vitamin and Mineral suppliments

It is best to fulfill your daily nutrition requirement from food rather than from supplements. Foods contain other substances which confer many health benefits and may not be available in supplements. However, in some instances a supplement may be necessary and professional advice should be sought.

Vegetarian diet

Vegetarian diets are healthful and nutritionally sound if they are carefully planned. Nutritional deficiencies such as protein, iron, vitamin B_{12} calcium & zinc are common among vegetarians and these can be overcome by including a wide variety of foods into your daily diet.

All vegetarians should ensure that they take plenty of cereals, pulses, seeds and nuts in their daily diet. Fruits, vegetables and dark green leaves are helpful in fulfilling daily requirements. Milk, milk products and eggs help in growth and maintenance of body while improving bone and teeth.

02 Eat Cereal based foods three times a day

Over generations, rice has been consumed as the staple diet and taking rice and other cereals three times a day fulfills the majority of energy requirement. Commonly used cereals in Sri Lanka are rice, *kurakkan*, millet (*meneri*), maize and wheat. Other than cereals, pulses, tubers, yams, legumes, starchy vegetables and fruits will ensure adequate energy supply and can be substituted for cereals.

Fifty to 65% of daily requirement of energy needs are met by cereals. Although the protein content is low in cereals (6-12%) in absolute terms, it provides up to 50% of the daily Protein requirement of a Sri Lankan due to large quantities of cereals consumed.

Cereals contain a high amount of natural fibre which will increase satiety, and reduce the rate of absorption of sugars and cholesterol. In addition, the fibre provides bulk to stool thus minimizing constipation and development of colonic cancer.

Effect of processing

Most of the vitamins in rice and other cereals are found on the outer surface of the grain. Polishing or refining these cereals lead to loss of B-vitamin depending on the degree of milling. Therefore, minimal milling is encouraged. Parboiling or steaming of paddy, results in movement of these vitamins from the outer layer into the centre of the grain and therefore is preferable to raw rice.

Dietary recommendations
based on foods and food patterns

- Starchy base should form around half to two thirds of the main meals.
- Amount of cereal consumed depends on person's age, sex, activity level and physiological state.
- Individuals who possess a higher weight for height (over weight or obese) and those who do not engage in adequate physical activity are advised to consume lower end of recommended amount of rice or starchy foods. Those who are at the risk of developing diabetes may also reduce the quantities in meals. Athletes, people who are undernourished and individuals who engage in heavy physical works should consume upper end of recommended rice and starchy foods in order to maintain their weight for height while meeting the requirement of energy.
- Different combinations of starchy foods should be included (eg: a combination of cereals /tubers & pulses, cereals/ starchy vegetables – jak fruit /bread fruit & pulses etc.)
- All cereals should be minimally milled.
- People of all age groups are encouraged to consume minimally-milled or parboiled rice and rice flour preparations.

Recommendations
for healthy eating

- Eat 2-3 cups of cooked rice per meal for an average adult.
- Total daily quantity can be evenly spread throughout the 3 main meals.
- Different products of starchy food could form part of the main meal.
- 5-10 string hoppers, 2-4 hoppers, 1-2 pieces of pittu can be taken as a main meal as an alternative to rice.

Eat less bread and other wheat flour preparations

In Sri Lanka bread and other wheat flour products are made of 70-75% wheat flour extract. During milling 25-30% of the grain is removed as bran, which contains most of the B complex vitamins, minerals (iron) and fibre. Wheat flour preparations should be taken in combination with other food groups. This will compensate for what has been removed during milling. The same will apply to highly polished rice and its flour.

In preparing string hoppers, hoppers, *pittu* and *rotti*, preference should be given to rice flour with added items such as *Kurakkan* to improve nutrient and fibre content of the meal. Whole wheat flour (*atta* flour) is a better alternative to all the above wheat flour products (an alternative to prepare *roti, chapathi, pittu* etc.)

Recommendations
for healthy eating

- Mix flour from pulses/legume (eg. *ulundu*, soya, *mung*, *kadala*) or millets (eg *kurakkan*) with wheat flour when preparing food, e.g. *thosai* / mixed flour *roti* and *pittu* which will improve the nutritional value.

- Use atta flour or mix it with wheat flour for preparation of food.
  e.g. *chapathi*, *rotti* etc..

- Bread should be consumed with vegetables and pulses/ fish/meat/eggs.
  (Avoid eating only with spreads/butter/jam frequently)

03 Eat plenty of vegetables and fruits

Sri Lanka is blessed with a wide variety of fruits and vegetables throughout the year and is identified as one of the twenty one countries with high bio diversity. Most of the fruits and vegetables are affordable and can be readily grown in home gardens. Each fruit or vegetable is different in taste as well as in micronutrient composition.

Why should we eat vegetables and fruits?

Fruits and vegetables are very good sources of vitamins, minerals, antioxidants and fibre. Vitamins and minerals are very important for the growth and maintenance of the body. They are needed for vital functions of the body such as metabolism and immune functions thus helps maintaining good health. Fruits and vegetables improve palatability because of the variety of taste.

Vegetables and fruits are low in calories but rich in fibre. It ensures regular bowel movements and helps in removing waste and carcinogens as well as reducing absorption of cholesterol. Eating a wide variety of fruits and vegetables regularly reduces the risk of obesity, diabetes, coronary heart diseases and cancers.

Important micronutrients in vegetables and fruits

Most of the Sri Lankan fruits and green leaves are good sources of beta carotene (vitamin A precursor) and vitamin C which prevents deposition of fat in blood vessels and also reduce the risk of certain cancers.

Vitamin C:

Vitamin C is required for the growth and repair of tissues in all parts of your body including cartilage, bones, and teeth. It is essential for the healing of wounds and proper functioning of immune system. Vitamin C is readily available in most vegetables and fruits especially if eaten fresh and raw (Box 3). Vitamin C is destroyed during cooking & processing. Eating a sour fruit after a main meal or adding lime juice to green leaves *(malluma)* will provide vitamin C which enhances iron absorption.

Box 3

Some good sources of Vitamin C

Fruits

- *nelli, pera* (*guava*), cashew fruit, star fruit (Carmaranga) & citrus fruits (*orange, lemon*), papaya, pineapple, *veralu (Sri Lankan olives)*

Dark green leafy vegetables & other vegetables

- drumstick leaves *(murungakola), kathurumurunga, gotukola,* kankun, raddish leaves, beetroot leaves, drumstick, capsicum *(malu miris),* bitter gourd *(karavila),* tomato

Vitamin A:

Vitamin A improves vision, promotes a healthy immune system, is essential for growth & development of cells, and keeps skin healthy. Carotenoids (pro-vitamin A), which are converted into vitamin A in the body, present in fruits and vegetables that are green, deep yellow or orange in colour (Box 4).

Box 4
Some good sources of Vitamin A

Animal sources
- Egg, whole milk, cheese, butter, meat, liver, kidney, fish oil

Dark green leafy vegetables
- *kathurumurunga, thampala,* spinach *(nivithi),* carrot & beet leaves, radish leaves, drumstick leaves, curry leaves, colocasia *(gahala)* leaves, and any other dark green edible leaves.

Other vegetables
- carrot, yellow sweet potato *(kaha bathala),* tomato, yellow pumpkin.

Fruits
- mango, papaya, *lavulu,* orange.

Iron:

Iron is an important constituent of haemoglobin. It influences the productivity of an individual as iron helps to improve both physical and intellectual capacity. Iron deficiency causes anaemia. Green leafy vegetables are rich in iron though, the bio availability is not as good as that of animal sources (Box 5).

Box 5
Some good sources of Iron

Meat
- liver, kidney & other organ based red meats, beef, pork, mutton

Fish
- Tuna (*balaya, kelawalla), savalaya,* dried sprats and other dried fish

Egg
- hen egg, quail egg, duck egg

Dark green and other leafy vegetables
- amaranth *(thampala), sarana, gotukola, mukunuwenna, kathurumurunga,* colacasia black (*kalu-alakola*), carrot and beet leaves.

Vegetables
- Lotus stem *(nelum ala)*

Pulses
- beans, soyabean, mung, ulundu, chickpea *(kadala),* cow pea and lentil (dhal)

Folate

Folate is a type of B vitamin found naturally in many foods. Folate helps your body to make new cells, especially blood cells. It is essential in neural tube development of fetus and functions of nerve cells. (Box 6)

Box 6

Some good sources of Folate

Dark green and other vegetables

- *Thampala,* curry leaves *(karapincha),* ladies fingers, lima beans, spinach, beets and most vegetables.

Fruit

- Plantain, pineapple, lime, *amberella,* orange and most fruits.

Pulses

- Beans, soyabean, *mung, ulundu,* chickpea, cowpea and peanuts.

Antioxidants

Some vitamins and minerals (Vitamin A, C, E and Selenium) found in food act as antioxidants, Foods with antioxidant properties help in the prevention of many diseases such as stroke, heart diseases, high blood pressure, cancer, inflammatory joint disease (arthritis), asthma and diabetes. Good sources of antioxidants (free radical scavengers) are raw & fresh vegetables, fruits, cereals, pulses, nuts and seeds. It is better to obtain antioxidants from food rather than from supplements.

Box 7
Some good sources of Antioxidants

foods rich in vitamin C and vitamin A (Box 3 & 4)

Fruits
- pomegranate, grapes, oranges, plums, pineapple, berries, grapefruit, water melon, apple.

Vegetables
- Tomato, spinach, lemon, red beet

Dry Fruits
- prunes, dates.

Vitamin E rich foods
- spinach, sweet potato, tomato, avocado, papaya, bell pepper, nuts & seeds, wholegrain products and oils like corn, olive

Selenium rich foods
- cereals (barley, wheat, rice, corn), nuts, soybeans, animal products (beef, chicken, egg,) and sea food (tuna, shell fish).

Spices
- cloves, cinnamon, ginger

Dietary fibre

Fibre in fruits and vegetables helps to regulate bowel movements thus preventing constipation, irritable bowel syndrome, and bowel cancer. Fibre indirectly removes toxins in the food and also reduces absorption of cholesterol.

Fibre is best obtained from foods (Box 8) rather than from fibre-supplements available in the market.

Box 8

Some good sources of Fibre

Cereals:

- parboiled rice, brown rice, kurakkan, corn & other whole grain cereals

Fruits:

- passionfruit, woodapple, guava, *beli*, banana, papaya, apple & pear with skin, orange, dried fruits such as dates, prunes, raisins

Vegetables:

- boiled carrot, ladies fingers, bittergourd, tender jak (*polos*), *kohila*, snakegourd (*pathola*), *vetakolu*, broccoli, spinach

Legumes:

- Dried peas, chick pea, cowpea, *mung*, lentils

Nuts and seeds :

- peanuts, scraped coconut, pumpkin seeds

How much of vegetables and fruits you should eat each day?

Taking variety of fruits and vegetables helps you to fulfill most of the micronutrient requirements. At least five varieties of fruits and vegetables should be consumed each day. An adult needs minimum of 400 g of fruits & vegetables each day.

Vegetables

At least 9 tablespoon of cooked vegetables or 3 cups of raw vegetable salads a day.

Fruits

1 - 2 medium size fruits (banana, orange, mango)
or 1 - 1 ½ cups of cut fruit/fruit salad
or 1-1 ½ cup of pure fruit juice
or 4 - 6 tbsp of dried fruit a day.

Take precautions to prevent cooking losses

Vitamins are lost during washing of cut-vegetables and during cooking. Extracting juices from fruits result in substantial losses of (pro)vitamin A and vitamin C. Simple modifications, such as cooking with the lid on; reducing the time lag between peeling/ cutting and cooking; cleaning before cutting; shorter cooking time and minimum storage time before consumption, minimises cooking losses. The use of raw and fresh vegetables is beneficial as it retains most nutrients. When making salads, cut the vegetables not more than half an-hour before eating and whenever possible eat with the skin.

04 **Eat** pulses, fish, dried fish, eggs, poultry and lean meat

Pulses, fish, dried fish, poultry, eggs and meat are good sources of protein. About 10 -15% of daily energy requirement should come from protein. Protein is the main building block of all cells of the body and functions as enzymes, hormones and other important molecules.

It is also a source of calories and needed to improve immune response. Protein deficiency affects all organs and is of particular concern during growth and development. Therefore adequate intake of high quality protein is essential for health.

In general, proteins from animal sources are of greater nutritional value because they usually contain all the essential amino acids.

Importance of consuming fish regularly

Fish or dried fish is a good source of quality protein, easily digestible, low in fat and has a wide variety of nutrients. Different types of fish give different health benefits (marine, fresh water, oily and shellfish).

When cooking use whole fish (without discarding the head) as it contains healthy oils. Enjoy fish baked, grilled, curry or fried.

Protein:

Fish protein is of very high quality and has sufficient amounts of all the essential amino acids required for growth and maintenance. Protein content of fresh fish is about 18 -20% of its raw weight.

Fish oils:

Fish is also a good source of omega 3 fatty acids. Recent research has shown that fish oils play a crucial role in the prevention of atherosclerosis, heart attack, depression and cancer. Eating fish, particularly fatty fish like *Salaya, Hurulla,* (sardinella sp.) *Kumbalalwa, Bolla* (Mackerel) at least twice a week will gives a person sufficient amounts of omega 3 fatty acids which helps in the development of brain and vision. Shell fish like Shrimp, crabs, cuttlefish and oysters are also good sources of omega 3 fatty acids.

Calcium:

Fish is a good source of calcium if bones are eaten, especially dried sprats (Anchovy sp.), *kunissa* (prawns sp.), *hurulla and salaya.* Calcium is essential for the formation and maintenance of the bones and teeth. It helps to reduce the risk and incidence of rickets in children and osteoporosis in adults. The high requirement of calcium in adolescence can be met by inclusion of fried small fish in the meal.

Vitamin D:

Other than milk and egg, fish is an excellent source for vitamin D and A. Especially oily fish like sardinella sp. salmon, Tuna, mackerel etc. Vitamin D aids in the absorption of Calcium, helps to form and maintain strong bones.

Iron:

Fish is a good source of iron (Haeme iron). This is better absorbed compared to iron of plant origin. All red fish, sardinella, dried fish *(karawala)*, shell fish are good sources of iron. Shellfish is an excellent source of Zinc, Selenium and Iodine.

Eat an egg as a source of complete protein

Egg contains high quality protein and is superior to the proteins found in meat, milk or fish. It supplies all the essential amino acids humans need and several vitamins & minerals except vitamin C.

Egg yolk contains fat, choline, vitamins and iron. Yolk contains appreciable amount of cholesterol and calcium while the egg white is almost all protein. The bioavailability of iron in egg is poor but can be increased by taking with vitamin C rich food. Adding vegetables to an omelette reduces the absorption of cholesterol.

Eggs should be boiled, fried or served as an omelette. Cooked eggs are easier to digest and pose a lower risk of Salmonella infection. As eggs are relatively cheap and easy to cook, it can be consumed regularly. For a healthy & physically very active adult or child, having an egg a day gives a great health benefit. People with atherosclerotic diseases or in the high risk group of getting atherosclerosis can mainly consume the egg white daily or 2 - 3 whole eggs per week.

Meat is rich in good quality protein

Meat is a valuable source of good quality protein. It also contains iron, zinc, copper and other minerals. Iron in meat is well absorbed and it enhances the absorption of iron from other sources too, e.g. absorption of iron in pulses / cereals can be enhanced by adding a small amount of meat. Therefore this contributes significantly to the prevention of anaemia.

Meat and meat products are excellent sources of all B complex vitamins, including B_{12} which is found only in animal products.

Meat is rich in cholesterol and fat, particularly saturated fat. Therefore persons who have high blood cholesterol levels should limit eating meat. The risk of certain cancers is higher in people who consume large amounts of red and processed meat.

Poultry has less saturated fat than other meats. The protein content is the same. When eating meat, visible fat should be removed as much as possible and skinless chicken is preferable.

Important nutrients in pulses

Pulses are not only a good source of protein but also rich in soluble fibre, complex carbohydrates, vitamins, and minerals. It is low in fat. Eating pulses regularly helps in reducing the risk of diabetes.

Protein:
Pulses (beans, green gram, cowpea or lentils) when combined with cereals, in a vegetarian diet, provide a high quality protein (e.g. lentil /gram/cowpea/*mung* + rice) comprising all the essential amino acids.

Vitamins:
Pulses are rich in B vitamins. Germination of pulses increases the content of vitamins B and C.

Iron:
Iron is present in pulses, but not in a form that can be readily absorbed by the body. Germination and fermentation increase the bioavailability of iron.

Good selections of pulses are: lentil (dhal), chick pea, cowpea, green gram *(mung)*, soya, seeds of beans etc.

Soya is also an excellent source of protein, vitamins, minerals, fat and fibre. TVP (Textured vegetable protein) is a food product made from soybeans and commonly used in Sri Lanka. Soy beans & soya products are ideal for vegetarians.

05 **Consume milk** or milk product daily

Milk is a wholesome food. Although not essential it is a useful source of energy, protein, minerals & vitamins for every age group. As breast milk is exclusively recommended for infants under 6 months, other milk or milk products are not indicated for this age group.

Consumption of milk products is especially important for children and adolescents who are building their peak bone mass. Encouraging children and adolescents to drink milk, instead of fizzy drinks is a healthy option.

Nutrients in milk

Vitamins:
Milk contains appreciable amount of many B vitamins, particularly rich in vitamin B_{12} which is required for healthy nerves and blood cells. Whole milk is a good source of vitamin A. But non fat or low fat milk has no or very little amount of vitamin A and other fat soluble vitamins unless fortified or enriched.

Minerals:
Milk is rich in calcium and phosphorus which are necessary for healthy bones and teeth. Milk calcium is particularly well absorbed by the body. Both non - fat milk & full cream milk has same amount of calcium. It helps to prevent osteoporosis in later life.

Fat:
Fat in milk gives considerable amount of calories (energy) to the daily requirement. Full cream milk contains high amounts saturated fat. Low -fat milk contains less than half the fat of full cream milk, and non-fat milk has nearly all the fat removed.

Non fat milk is preferable to adults, obese children & especially for those with cardio vascular diseases, as animal fat aggravates cholesterol deposition in blood vessels. However, low fat milk contains less energy, deficient in essential fatty acids and fat soluble vitamins. Therefore it is not suitable for children under two years of age, in instances where cows milk is prescribed.

Sugar:
Milk contains a sugar called lactose. However unlike other sugars such as sucrose (white/brown sugar), lactose in milk has very low risk of tooth decay.

Milk Products

Curd

Curd and yoghurt are the commonly used milk products in Sri Lanka. These fermented products are rich in B vitamins and the high protein content enhances the bioavailability of calcium. Curd from buffalo milk is rich in fat and set harder than cow's milk.

Yoghurt

Yoghurt contains bacteria that are beneficial to humans. Some forms of yoghurts contain healthy bacteria that are beneficial for digestive system (probiotics).

Cheese

Cheese contains the same beneficial nutrients as milk, but most cheeses contain high amounts of saturated fat and high level of added salt. So it is important to eat full-fat cheese occasionally and in small portions.

Osteoporosis:

This condition causes thinning of bone tissue and loss of bone density over time resulting in increased risk of bone fractures. This can be prevented by regular use of milk and milk products throughout life starting from childhood. Diets rich in milk and milk products can reduce the risk of low bone mass throughout the life cycle.

Lactose intolerance

Some individuals find it difficult to tolerate large amounts of milk (500 ml or more at any one time) as they develop gastrointestinal symptoms such as diarrhoea or abdominal bloating and it's known as lactose intolerance. They should start drinking milk in small amounts (e.g. quarter glass) and gradually increase.

However they can tolerate curd or yoghurt as the lactose has been converted to lactic acid during fermentation. Drinking milk after a meal or switching to curd or yoghurt is another option. Soy milk is an alternative for those who are allergic to the cow's milk protein.

How much should we take?

1 - 2 cups/glasses (200-400 ml) of fresh milk or,

1 - 2 cup of curd / yogurt

2 - 4 tbsp of milk powder

Children, adolescents, pregnant and lactating mothers may take double the above mention amounts as their requirements are higher.

06 Consume moderate amount of fats

Everyone needs some fat in their diet. Although fat serves a number of functions which are beneficial, taking excess of certain types of fat may increase the risk of some diseases. Fats are commonly consumed in the form of oils, spreads, nuts and coconut milk. In Sri Lanka, coconut is the main source of fat. In urban societies, animal sources (meat, milk & their products) also contribute to dietary fat.

Why should we need to consume fat?

Adequate amounts of dietary fat are essential for health. Fats provide energy to the body (9 kilocalories per gram). Also, fats in foods provide essential fatty acids and helps absorption of fat soluble vitamins (vitamin A, D, E, K). Some fats are a source of antioxidants which are known to reduce the risk of some cancers and chronic diseases. In addition, fats contribute to texture, flavor and taste, and therefore increase the palatability.

Adequate intake of dietary fat is particularly important prior to and during pregnancy and lactation. Adding a small amount of oil when preparing a meal, increases the energy density and helps alleviating energy-protein malnutrition. However excessive dietary fat consumption increases the risk of obesity, coronary heart disease (CHD), diabetes and certain types of cancer.

The major component of dietary fat is fatty acids. Different food contains different types and amounts of fatty acids. Major groups of fatty acids are associated with different Health effects. Following are the major groups.

- ***Saturated fatty acids*** – Saturated fats should provide no more than 10% of the daily energy intake. These fatty acids increase LDL cholesterol and contribute to the development of coronary heart diseases and other vascular diseases. Therefore, consumption of saturated fats should be limited, especially individuals at risk.

The main sources are milk & dairy products, meat & meat products,, coconut, coconut milk, coconut oil and other oils. Hidden saturated fats are found in cakes, biscuits, pastries, other bakery products, fried foods and chocolates.

- ***Monounsaturated fatty acid (MUFA)*** – This type of fat has a protective effect on the heart as it helps to enhance HDL cholesterol (Known as good cholesterol).

Main sources are cashew nuts, peanuts, *kottang*, *gingelly,* other nuts & vegetable oils (e.g., canola, olive, high oleic safflower, sunflower & *gingelly* oils). Avocado also contain high amount of these fatty acids.

- ***Polyunsaturated fatty acid (PUFA)*** – There are two types of PUFA called Omega 6 and omega 3. They are essential to the body as they cannot be synthesised by humans.

They help to control cholesterol levels in the body and reduce the risk of developing heart diseases.

It is important to maintain the correct balance in Omega 3 and 6 which are essential for early human development and functioning of nervous, vascular, immune, and renal systems.

Omega 3 fatty acids help in preventing various inflammatory diseases, asthma, arthritis, diabetes, skin diseases and other auto-immune diseases. Eating food containing excess omega 6 fatty acids will antagonise the above health effects.

Sources of omega 3 fatty acids are oily fish (e.g. mackerel, tuna, herring, sadinella, *kumbalawa*, trout, salmon) soybean oil, canola oil and to a lesser extent in green leafy vegetables. Breast milk has an adequate amount of derivatives of omega 3 fatty acids (DHA) to fulfill the needs of the infant.

Sources of omega 6 are egg, meat, poultry, seeds and oils of gingelly, pumpkin seed, corn, soya and sunflower.

- ***Trans fats*** – Heating unsaturated vegetable oils in high temperatures results in formation of trans fats. Consumption of foods with trans fats increases the risk of heart diseases and stroke.

Deep frying using palm oil and other vegetable oils (PUFA and to a lesser extent MUFA) also produces trans fats. Therefore these oils should not be used for deep frying or re-frying.

The risk of formation of trans fats in coconut oil is minimum, as it mostly contains saturated fatty acids. Therefore, it is more suitable for deep frying.

other bakery products as well as deep fried foods, biscuits, cakes, & some types of margarine contain high amount of trans fats. Trans fats increase unhealthy cholesterol and increases the risk of heart diseases. Therefore consumption should be restricted.

- ***Cholesterol*** **–** Cholesterol is present only in animal sources of food (meat, sausages, bacon, eggs, whole milk, cheese, butter, liver). Cholesterol is a component of cell membranes and used to produce hormones and bile acids. Humans synthesise sufficient cholesterol to meet biological requirements. Excess cholesterol can get deposited inside blood vessels leading to atherosclerosis

Recommendations

Recommendations on the quality of fat in the diet for optimal health are made across the life course, from an age of about 2 years onwards:

- fat should provide up to 15-30% of the daily energy intake;
- saturated fat should provide no more than 10% of the daily energy intake;
- polyunsaturated (omega~~6~~ and omega~~3~~) fats should contribute 6–11% of the daily energy intake;
- intake of trans fats should be less than 1% of the daily energy intake;
- remainder of the energy from fat can be provided by monounsaturated fats.
- cholesterol intake should be less than 300 mg/day.
- n-6 PUFA to n-3 PUFA ratio should be 4:1 in the diet.

Practical aspects in **following the guidelines:**

Following practices will help to optimise your health.

- Coconut milk, oil and kernel are important sources of fat and main ingredients in the Sri Lankan diet. Coconut and coconut milk can be added to foods to increase energy density of the diets fed to children, adolescents, pregnant and lactating mothers. An average family of five can use one medium size coconut a day.

- Daily requirement of unsaturated fats can be met by consumption of cashew nuts, pea nuts, kottang, pumpkin seeds, gingelly & avacado.

- Include fish in your diet preferably oily fish like tuna, herring, sardines and mackerel.

- Vegetable oils - such as olive, canola, gingelly, soya, sunflower and corn oil are good sources of unsaturated fats.

- Unsaturated vegetable fat spreads with no or less trans fats, rich in n-6 and n-3, made from canola, sunflower, safflower or olive oil are preferred as a spread because butter contains more saturated fats.

- Whole milk is a source of saturated fat. Low or non-fat milk and milk products (such as low-fat yoghurts) are preferred for adults and overweight children above 2 years of age and for people with high risk of developing cardiovascular disease.

- Limit consumption of cakes, biscuits, short-eats, fried snacks (potato crisps) as they contain high amount of trans fats.

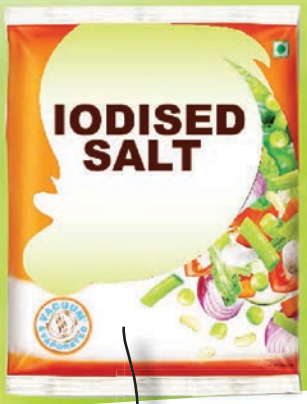
- Discard the skin of chicken and remove the visible fat in meat before cooking.

- Limit consumption of processed meat like sausages, meat balls, ham, bacon etc.

- Use a little amount of oil (preferably unsaturated oil) for tempering. Minimise deep frying. Do not re-use oil once used for frying unless with coconut oil. Use non stick pans as the amount of oil required is less.

- Read the nutrition information labels on packaged foods and avoid products high in saturated and trans fats.

- Oils, being an energy dense item of food, can be effectively used for infants and young children in complementary feeding. However care should be taken not to exceed the recommended intake.



07 Limit salt intake and use only iodised salt

From the beginning of human civilisation, salt has played a prominent role in the palatability of the diet. Salt is the main contributor of sodium in the diet, an essential nutrient whose balance in the body is generally well maintained. Sodium that is naturally present in food is adequate to meet daily requirements. However, those who sweat a lot need more salt. The recommended intake of added salt is < 5g/ day (~ 1 tsp).

Sources in the diet

Salt in the diet can come from different sources

- Present in small quantities in all foods.
- Added during cooking.
- Added at the table.
- Added during the processing of foods e.g. meat products such as salted & dried fish, ham, bacon, salt beef, sausages, butter & margarine, canned vegetables, marmites & vegemite (yeast extracts), soya sauce, many snacks such as savories, biscuits, crisps, pickles, bread and some breakfast cereals.

Why should we limit salt?

A diet lower in common salt and higher in potassium is expected to lower the blood pressure of the population as a whole. Consuming more fruits and vegetables increases potassium intake. People with high blood pressure should restrict the salt intake. This sensitivity to salt seems to be greater as age increases. High salt increases calcium excretion in urine and therefore, increases calcium requirement.

Use of iodised salt

As salt is used almost in every household, fortification of salt with iodine has been done in order to improve the iodine status of individuals in the community. Use of salt has to be restricted to iodised salt.

Iodine plays a major role in the formation of thyroid hormones which are essential for physical and mental functions of the human being. Iodine deficiency causes mental retardation and impairs growth and development.

How do you protect iodine in salt?

- Store salt in a dark coloured bottle and away from the cooker/fire (or any other source of heat).
- Do not wash salt before adding to food.
- Add salt when food is almost cooked.

How do you **reduce** salt consumption?

- Add small amounts of salt during cooking. Learn to use spices and herbs, to enhance the flavor of food.
- When planning meals, consider fresh foods that are lower in sodium than ready-to-eat processed foods.
- Remember that fresh fish, poultry, and meat are lower in sodium than salted, canned or other processed products.
- When selecting canned foods, select those prepared with reduced or no salt.
- Limit sauces, pickles, *lunu dehi*, packaged mixes, chutneys, salad dressings, ketchup and mustard cream contain added salt.
- Choose fresh fruits and vegetables as a low sodium alternative to salted snack foods.
- Remember processed and packaged food has a lot of salt added during processing.
- Delay introduction of salt to infants and young children. This will delay acquiring the taste and will be satisfied with less salt. Note that the taste for salt is always acquired. If you get used to low amounts you will be satisfied with it.

08 Take less sugar, sweets or sweetened drinks

Sugar is a common item in the Sri Lankan diet. It has no nutritive value other than calories.

Sugar consists of simple carbohydrates. During digestion in the small intestine all carbohydrates except dietary fibre breaks down into sugars. Simple sugars are more easily converted to glucose because their molecular structure breaks down faster. Sugar mainly supplies energy and is used to sweeten food & beverages like tea, coffee etc.

Jaggery and treacle are the unrefined concentrates obtained from *kitul*, palmyrah (*thal*), coconut and sugarcane juice. It is commonly used in several preparations in our country and is a good source of minerals. Brown sugar and jaggery have an added benefit over white sugar as it contributes to the mineral intake, especially iron and calcium.

Consume sugar sensibly

The high intake of sugar and foods with added sugar e.g. confectionery, biscuits, cakes and drinks should be discouraged. It may contribute to an excess of energy supply leading to overweight and obesity, which in turn, is a risk factor for a number of diseases such as coronary heart disease, diabetes mellitus and some cancers. Sugar in food produces a rapid increase in blood sugar, which could damage the cells in the pancreas that produces insulin. Continuous over stimulation of the pancreas in this way could lead to diabetes. Consumption of added suger should be minimised; enabling to enjoy natural taste of food.

Dental caries or tooth decay is a common health problem in Sri Lanka. There is a link between sugar consumption and dental caries.

It should not be forgotten that there is a high quantity of "hidden sugars" in commonly consumed sweets, snacks and beverages (Box 9).

Box 9

Hidden sugar in commonly consumed foods

		Equivalent of No. of teaspoons (sugar)
Milk chocolates	1slab (100g)	14
Chocolate biscuits fully coated	9 biscuits (100g)	11
Fruit cake, plain	1 pcs (50 g)	5
Cola carbonated drink	1 glass (200 ml)	5
Ice cream (vanilla)	100g	4 ½
Lemonade	1 glass (200 ml)	3
Jam	1 tbsp (20g)	3
Malted drinks, powdered	1 tbsp (15g)	1 –2
Tomato ketchup sauce	1 tbsp (15g)	1

1tsp of sugar = 4g

(Source: McCance and Widdowson's, 6th edition, 2008, The composition of foods)

09 Drink Plenty of Water

About 70% of our body is made up of water. It is important for many metabolic functions of the body. An adult should drink about six to eight 200 ml glasses (~1.5 – 2 L) of water a day. Don't wait till you feel thirsty, but spread it throughout the day.

Am I drinking enough water?

Following is a basic guide that an adult should follow to decide on the volume of liquid, one should drink each day;

$$\text{Amount of liquid (L)} = \frac{\text{Body Weight (kg)}}{\theta}$$

Volume of liquid needed for children depends on the weight and following is a guide that could be used for each age group.

Age group	Pre-school child (1 – 5 years)	Primary School child (6 - 10 years)	Adolescent (11 - 18 years)
Fluid volume*	750ml -1 L	1-1.5 L	1.5 - 2 L

* Based on fluid requirement of the male child's median weight based on WHO and CDC growth charts

If one is drinking adequate water they should not feel thirst and should pass colorless urine.

Who should drink more water?

Those who are living in warm climates, during febrile illnesses, lactating mothers and during physical exertion.

Ensure that you take clean water

Water can be contaminated by germs as well as by chemicals. Commonest chemical contamination that occurs in nature is due to Fluoride. Long term ingestion will lead to bone and teeth defects.

If water is not clean, boiling the water for 5 minutes at boiling point will help to kill many germs. In areas where the fluoride content of water is high (North Central province), it is advisable to use special filters approved by the Water Board and also to avoid using fluoride containing toothpaste.

Can we substitute water with other drinks?

- To relieve your thirst, best drink is water.
- Tea without milk and sugar will have certain advantages as they have some antioxidants which will help to improve health. But it is advisable to avoid tea or coffee closer to a main meal, as it will reduce iron absorption.
- Fruit drinks should be taken without added sugar and without removing the fiber.
- Fizzy drinks contain lot of sugar and it will lead to weight gain and reduce appetite. Phosphoric acid in these drinks leads to decaying of teeth and allergic conditions (e.g. Bronchial asthma). Therefore it should be avoided as far as possible.

Alcohol

Consumption of alcoholic beverages is harmful to health. It can lead to hypertension, cirrhosis, peptic ulcer, and oesophageal cancer. Those who consume alcohol are 7 times more likely to develop cirrhosis than those who do not.

10 Maintain a healthy body weight through a balanced food intake and regular physical activity

Why regular physical activity is important for an individual?

Physical activity plays an important role in creating and sustaining well-being at all ages leading to a healthy life. It is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Patterns of physical activity and healthy life styles acquired during childhood and adolescence are more likely to be maintained throughout the life span thus imperative for the future health of all populations.

The daily energy intake (from food and drinks) of a healthy individual should be balanced with the amount of energy spent (energy expenditure).

Benefits of physical activity

It is recommended that all healthy individuals engage in adequate levels of physical activity throughout their lives to achieve overall health; physical, mental, social, spiritual and become a physically and mentally fit person. Being physically active from an early age prevents many diseases and disabilities in adulthood.


It helps to build and maintain healthy bones, muscles and joints. In addition, physically active adults and children enjoy other health benefits, such as

- weight control
- lower blood pressure
- improved psychological well-being
- healthy cardiovascular system (heart and lungs)
- develop neuromuscular awareness (coordination & movement control)
- improve school performance
- increase productivity in the work places and reduces mental stress and risk of non communicable diseases such as heart disease, diabetes, osteoporosis and osteoarthritis.

Despite the benefits, physical activity levels are on the decline among young people all over the world. This is mainly due to changes in the lifestyles of people from outdoor activities to indoor sedentary activities. Therefore, factors influencing the sedentary lifestyle such as spending more time on watching TV, working with a computer must be overcome. (refer activity pyramid).

Need to motivate to engage in sports and other physical activities in groups or individually. Encourage everyone to engage more in household activities like washing clothes, cleaning, gardening etc.

General guidelines for healthy physical activity

- Engage in physical activities at least 30 minutes per day, most days of the week.
- Thirty minutes of daily physical activities may be broken into shorter periods if necessary e.g. 3 brisk walks or cycle rides of 10 minutes each.
- Most of the daily physical activities should be aerobic (e.g walking, running, jogging, household work etc.).
- Vigorous-intense activities should also be added, including those that strengthen muscle & bone, at least 3 times per week.
- Organised group sports are encouraged.
- Duration of physical activities vary depending on the intensity and physiological status of the individual (Table 1)

Recommended physical activities and amounts

Table 1: Moderate- and vigorous intensity physical activities

Moderate-intensity Physical Activity (approximately. 3 – 6 METs) Requires a moderate amount of effort and noticeably accelerates of heart rate	**Vigorous -intensity Physical Activity (approximately. >6 METs)** Requires a large amount of effort and causes rapid breathing and a substantial increase in heart rate
Brisk walking	Running
Dancing	Walking / climbing briskly up a hill
Gardening	Fast cycling
Yoga	Aerobics
Housework and domestic chores	Fast swimming
Active involvement in games and sports with children / walking domestic animals	Competitive sports and games (eg: Traditional Games, Football, Volleyball, Hockey,Basketball, Badminton)
General building tasks (eg: roofing, thatching, painting) Carrying / moving moderate loads (< 20kg)	Heavy Shoveling, digging, construction works Carrying / moving heavy loads (> 20kg)

(MET = Metabolic Equivalents; 1 MET = energy cost of sitting quietly; & is equivalent to caloric consumption of 1 kcal/kg/hour)

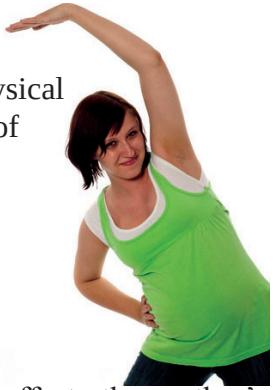
(Source: WHO: Global strategy on Diet, Physical activity and Health)

Table 2 – Recommendations for Physical Activity

Age group	Duration of exercise	Type of physical activity
(a) Young people (5 - 18 years old)	60 minutes - each day	moderate - to vigorous intensity developmentally appropriate and involves a variety of activities
(b) Adults (18 - 65 years old)	30 minutes - 5 days a week 20 minutes - 3days a week at least 2 days a week	moderate - intensity or vigorous-intensity or an equivalent combination of moderate and vigorous-intensity and 8 - 10 muscular strengthening exercise (8 – 10 repetitions)
(c) Older Adults (65 years & above)	Same as adults	with due consideration for the intensity and type of physical activity appropriate for older people and exercises to maintain flexibility and balance exercises

[Source: World Health Organization adapted from an evidence-based review by the American College of Sports medicine / American Heart Association (2007) and Strong et al (2005)]

(D) Pregnant women



30 minutes or more of moderate - intensity physical activity on most days of the week (in absence of medical or obstetric complications).

(E) Lactating mothers

Neither acute nor regular exercise adversely affects the mother's ability to successfully breastfeed.

What is healthy body weight?

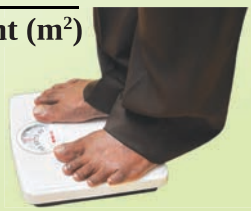
An age and height appropriate body weight will reduce the risk of Complications of underweight, obesity and related non-communicable diseases.

How do you evaluate your body weight?

Body Mass Index(BMI)

BMI is a measurement commonly used to assess whether a person has an appropriate weight for height. BMI is calculated by dividing the person's weight in kilo grams by height, squared in meters (figure 2).

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



If your (adults) BMI is

< 18.5	he/she is considered **underweight**. Increase the energy intake from food with regular moderate physical activities.	
18.5 – 24.9	**normal -** continue a balanced food intake with regular moderate physical activities.	
25 – 29.9	**over weight,** increased risk for weight related diseases.	Regulate energy intake from food with regular intense physical activity targeting weight reduction.
>30	**obese,** high risk for weight related diseases.	

Waist circumference:

It is an approximate index of intra abdominal fat mass and total body fat. Apart from maintaining a healthy body weight, it is important to maintain an individual's waist circumference within healthy limits. If **waist circumference** > 90 cm (36") in males and > 80 cm (32") in females is associated with increased risk of cardiovascular and other forms of chronic diseases.

(Source International diabetes federation cutoff values to diagnose metabolic syndrome; Alberty et al 2006)

How do you maintain correct body weight?

Balance the amount of calories obtained from food and beverages against the calories expended in day to day activities.

- **Daily food allowance can be taken in 3 - 5 meals; three main meals and if necessary two healthy snacks in between (box 10). A gap of around three hours should be maintained between each meal.**

- Take meals and snacks at regular intervals.

- The quantity of food consumed should match the physical activity level.

- Consuming natural food of high nutritive quality is better, safer and cost effective than using nutritional supplements for development and strengthening of muscles.

Box 10
Some healthy snacks

Any fruit / fresh fruit juice

Yoghurt / curd

Boiled tempered gram /green gram

Boiled cob of corn

Gingelly, cashew nuts, peanuts or any other healthy nut

Boiled manioc / sweet potatoes or any other yams with scraped coconut

helapa, sago pudding, *mung guli* & *other homemade cereal based products*, *wade* etc.

Guidelines for a **weight reduction** programme in overweight and obesity

01. A safe weight reduction programme should be planned on an individual basis considering the lifestyle and medical history.
02. A sensible meal plan should meet the daily dietary requirements from variety of food representing all food groups.
03. Limit consumption of excess staple or starchy foods.
04. Food rich in fats & simple sugars should be limited.
05. Consumption of plenty of fruits & vegetables will help to maintain optimum body weight.
06. An appropriate exercise program should be followed.
07. Aim for a realistic goal for weight loss (approximately 0.5 – 1.0 kg per week).
08. It is important to maintain Proper weight.

Physical activity pyramid will guide you on the duration and type of activities that are important for a healthy life.

Physical Activity Pyramid

Cut down

Watching TV, Playing computer/Video Games, working on computer for hours

2 - 3 times a week

* Sports –vol ley ball tennis, etc
* Swimming, Weight lifting
* Yoga, gardening

3 – 5 times a week

* Cycling
* Running/ jogging
* Dancing, skipping
* Aerobics, stair climb

Everyday

- Be active
- 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

11 Eat additional food during pregnancy and lactation

Women must eat sensibly during pregnancy and lactation. The fetus acts as a parasite on the mother and some nutritional deficiencies of the mother will have adverse effects on the fetus. A sensible diet during pregnancy will ensure that the fetus gets an adequate supply of nutrients and that the mother will not suffer from any deficiencies after pregnancy.

Preparation for pregnancy

Ideally, pregnancy must be planned and part of preparation is to ensure a normal BMI. Guideline for weight gain in pregnancy is described in box 11. Pre-pregnancy BMI has a profound influence on the outcome of pregnancy.

A 'normal' pre-pregnancy weight reduces a host of risks in pregnancy including mother developing gestational diabetes or having a baby with low or high birth weight.

What is a healthy diet during pregnancy?

The amount of food a woman should consume during pregnancy will vary according to her level of physical activity and her BMI at the beginning of pregnancy.

It must be remembered that the needs during different stages of pregnancy will be different. There is only a minor increase in nutritional needs during the first 3 months of pregnancy (1st trimester) and this keeps on increasing steadily to reach a peak in the third trimester (after 28 weeks of pregnancy).

A diet that encompasses all these needs should be taken for an optimal pregnancy outcome.

These include;

- sufficient calories to gain weight at a desirable rate (Box 11).
- variety of foods from each of the six food groups every day (Box 12)
- sufficient amount of fluid (minimum of 8-10 cups/day).
- sufficient amount of fiber rich food to prevent constipation.
- healthy food items of your choice can be included in the diet.
- at least one glass of milk or an equivalent amount of milk product should be consumed each day
- avoid alcohol and active or passive smoking

Box 12
Recommended number of servings from each food group during pregnancy

Rice, bread, other cereals and yams (7-11 servings).

Fruits (3-4 servings).

Vegetables (4-5 servings).

Milk and dairy products (1-2 servings).

Fish, pulses, meat and eggs (2-3 servings).

Nuts & oil seeds (2-4 servings).

What are the key micronutrients in pregnancy?

Micro nutrients are nutrients that are required in small amounts. Some of these are needed in additional quantities during pregnancy. Deficiency of these key micro nutrients could have serious adverse effects on the pregnancy and the new born.

Folate:

Folate helps to prevent neural tube defects in the fetus. Its intake should be increased before conception to achieve maximum benefits and continued throughout pregnancy (Box 6).

However, it is advisable to take folic acid tablets daily if one is planning a pregnancy as the effect of folate deficiency is greatest during the first few weeks of pregnancy, when most women will be unaware that they are pregnant.

Folate supplements can be continued throughout the pregnancy and it will help to prevent certain anaemias as well.

Iron

Need for iron increases during pregnancy to meet the needs of increased red cell production in the mother, growth of the uterus, placenta and fetus. However this increased requirement starts only at the beginning of the second trimester and increases steadily to reach a peak in late pregnancy and remains during lactation.

Special attention should be given to include iron rich foods (box 5) to the daily diet. Foods of animal origin are the best sources of iron. In general, most forms of iron are not easily absorbed, with the exception of iron in red meat. Absorption of iron is increased when the iron rich food is taken with vitamin C rich food (box 3). Germination of pulses also increases the availability of iron.

As the Sri Lankan diet lacks iron rich food, it is recommended to take iron supplements daily during pregnancy and lactation. Iron supplements are poorly absorbed when they are taken with beverages such as coffee or tea or simultaneously with calcium supplements. Therefore the best is to take them on an empty stomach. In women who develop side effects such as nausea, they could be taken

immediately after a meal. Adverse effects of iron supplements could be reduced if taken at bed time, or with fruit juice.

Iron supplements should be continued for six months after delivery to replenish the stores and to prevent future iron deficiency anaemia.

Calcium:

The need for calcium is increased during pregnancy and throughout lactation. If a woman's intake of calcium is low, calcium will be mobilised from mother's bones to meet foetal needs. If the long term calcium intake remains low, it would lead to a reduction in the mother's bone mass. Box-16 provides a list of foods that are rich in calcium. Calcium supplements are provided by antenatal clinics in Sri Lanka.

Vitamin C:

It enhances the absorption of iron and also reduces the risk of infections. Three to four servings of food containing vitamin C (Box-3) will provide the daily requirements of vitamin C.

Ioඩ ne

Consumption of iodised salt will provide the pregnant mothers' iodine requirement.

Weight gain during pregnancy

The total weight gain in pregnancy should be consistent and gradual. Women generally do not gain weight in early pregnancy and in the first trimester they may be even a lose weight due to the loss of appetite and nausea. This will not adversely affect the pregnancy.

Weight gain in pregnancy is dependent on pre-pregnancy body mass index and the number of fetuses. The recommended formula for weight gain in pregnancy is shown in Box 11. Adequate weight gain helps to improve birth weight of the baby. Consumption of a combination of food from all 6 groups in recommended proportions is encouraged throughout pregnancy.

Inadequate weight gain may lead to low birth weight and could affect the baby adversely.

Similarly excessive weight gain during pregnancy could also lead to increase risks for adverse pregnancy outcomes in both mother and baby. Mothers belonging to overweight and obese categories should take extra care to limit their calorie intake by reducing the intake of calorie dense food (e.g. sugar, sweetened drinks, pastries, fatty & fried foods, malted and energy drinks). They are advised to consume low-fat milk instead of full cream milk.

Box 11
Guidelines on weight gain in pregnancy

BMI (kg/m²)	Expected Weight Gain in kg.
<18.5 (underweight)	12.5-18
18.5-24.9 (Normal)	11.5-16
25-29.9 (over weight)	7.0-11.5
>/= 30 (Obese)	< 6.8

Source: IOM 2009, weight gain during pregnancy

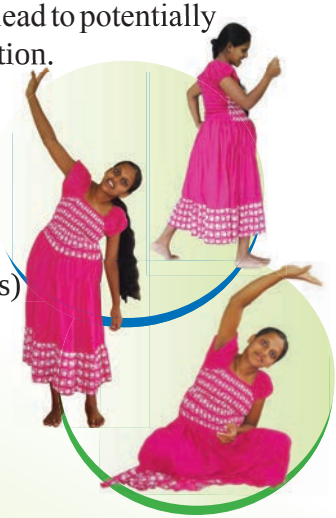
Morning sickness

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

The following actions may help to reduce its intensity:

- Take a light meal, before getting out of bed in the morning
- Eat small meals and snacks. Dry, high carbohydrate foods such as crackers, wafers, dry toast, or dry cereals are preferred.
- Avoid stomach being empty. Consume small meals or snacks about every 2 hours and drink fluids about half an hour after consuming solid food.
- Avoid stomach being too full by eating large meals.
- Avoid odors or tastes that trigger vomiting.

Excessive vomiting however is abnormal and could lead to potentially dangerous complications. It requires medical attention.



Constipation

Constipation is commonly seen during pregnancy. A gradual increase of food rich in fibre whole-grain cereals, fruits, vegetables and pulses) liquid is recommended. Exercise (walking, swimming) also helps to alleviate this problem.

Breast-feeding (lactation)

Demand for energy in a breast feeding mother is more than that of a pregnant woman. Even the mothers with good weight gain during pregnancy should increase their food intake covering all food groups.

The role of calcium during breast-feeding

Breast milk is rich in calcium and a breast-feeding mother may have her calcium deposits (in her bones) mobilised to meet the needs. This will lead to a reduction of calcium in her bones, which will make them weaker. This can be avoided by taking calcium rich food (box 16).
Continuing calcium supplements during lactation is helpful.

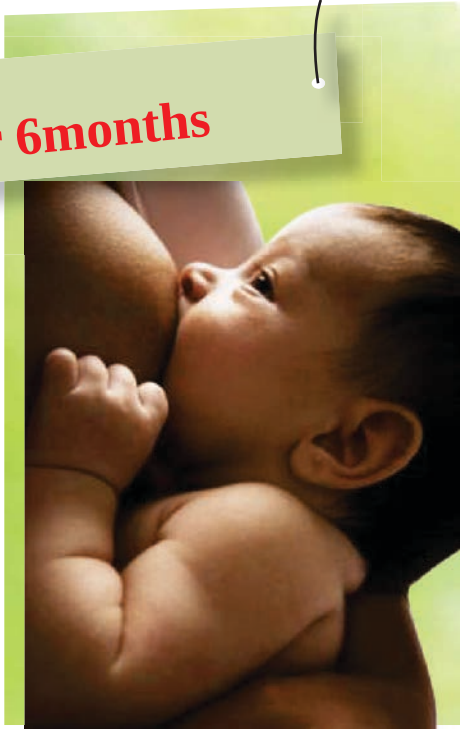
Are 'special' supplements of value?

There is no advantage in taking special nutritional supplements such as milk powder that are marketed as conferring special benefits to the baby. On the contrary, they may interfere with the mother's appetite due to the high content of protein. Their cost- benefit is low since good quality nutrition could be obtained at a much lower cost through natural food.

The importance of taking plenty of fluids during pregnancy

Apart from reducing constipation, extra fluid intake helps to prevent urinary tract infections. Pregnant women also tend to perspire more and this needs to be compensated as well.

12 Exclusively breast feed for 6months



Breast milk is the best, safest and nutritionally most appropriate food for the new born baby. In the initial few days mother secretes thick yellowish milk in small amounts known as **Colostrum** which is essential and totally adequate for the new born. It is rich in nutrients and helps to protect the baby from infections. All of it should be given to the child.

Exclusive breast feeding should be continued till the completion of 6 months and complementary food is introduced thereafter while continuing breast feeding up to 2 years and beyond.

Benefits & breast feeding to the baby

- Provides all required nutrients in optimum amounts needed for growth and development
- Easily digested and absorbed
- Protects against infections.
  e.g. diarrhoea, respiratory tract infections, ear infections etc
- Prevents constipation
- It is clean and ready to use at any time
- Leads to bonding between baby and mother
- Prevents allergies later in life such as asthma and eczema
- Prevents non-communicable diseases later in life.
  e.g. obesity, diabetes etc

To mother and family:

- Prevents development of breast cancer in mother
- Helps to reduce weight in mother
- Economical

Why child should be given only breast milk for 6 months?

The volume and nutrition composition of breast milk is adequate for a newborn baby to grow optimally till 6 months of age. Breast milk will also provide adequate amounts of water to the baby. Therefore the baby does not require additional water. Giving exclusive breast feeding till 6 months will help to prevent disease and allergies in the baby while achieving optimum growth and development.

How long should one breast feed

Breast feeding should be started within one hour of birth. The baby should be fed on demand. It is important to measure weight monthly to identify weight gain. If weight gain is not optimum, should seek medical advice. Complementary food should be started at the completion of 6 months of life while continuing breast feeding till 2 years and beyond.

Do babies need vitamin supplements?

Normally during exclusive breast feeding, babies need no additional vitamins or minerals. Premature and low birth weight babies may need supplements and should be given only on medical advice.

During illness child should be given breast milk uninterrupted

It is very important to maintain adequate nutrition to the baby during ill health to hasten recovery and prevent growth faltering. Hence continuing to breast feed, even increasing the frequency is beneficial.

Working mother

Mothers can express milk and give the baby during her absence. Expressed milk in a clean covered container can be kept for 6 hours at room temperature and for 24 hours in the refrigerator (non-freeze compartment). It should not be boiled before feeding. Expressed milk could be fed with a cup or a cup and spoon.

If the mother has to be away at work for long periods and is faced with difficulty in expressing and storing breast milk, still may not need infant formula milk but complementary feeding can be started at the completion of 4 months after seeking medical advice.

13 Start **complementary feeding** at the completion of 6 months

After completion of 6 months (180 days) of age, mother's milk alone can not provide the increasing demand for all the nutrients and energy required by the growing baby. Therefore additional food need to be introduced to meet this requirement.

What are the suitable foods?

Rice is the best food to begin with. It should be mashed and of semisolid consistency. It can be fed with a spoon. Pulses, mashed potato, vegetables, and fruits should be gradually added. Fish, sprats, meat should be included in the daily diet early and a variety of food including eggs are added as time passes by. At one year of age child should be able to eat normal family diet.

Box 13
Methods to improve nutrient quality of complementary foods

- Ensure variety in every meal
- Introduce foods of animal origin & pulses early
  Fish, sprats, poultry, meat, liver & egg –w hich are rich sources of iron Alternatively green gram, cowpea, *kadala*, soya, *thampala*, *sarana*, *gotukola* can be included in the daily diet
- Add pulses preferably germinated (sprouts)
- Add one or more out of liver, egg yolk, yellow pumpkin, yellow sweet potato, carrot, papaya, mango & dark green leaves - which are rich sources of Vitamin A
- Include locally available fruits daily
  Fruits should be given in the mashed or pulped form & not in the form of juices
- Add coconut milk or 1-2 tea spoon of coconut oil when cooking food or 1-2 tea spoon of fat spreads or butter to the cooked food - this make food softer, palatable, tastier and energy dense.
- Milk products such as yoghurt & curd and homemade cereal based foods can be given as snacks –t hese should be given without adding sugar or honey

Guide to correct **complementary feeding.**

Feed them in semisolid form from the very beginning

- Add a little breast milk to get the right consistency and also the taste
- Wait till child is adequately hungry before feeding
- Feed child before he becomes sleepy
- Offer a variety of food
- Do not reduce food during illness – children need more food during ill health
- All utensils and hands need to be washed before preparing and feeding
- Include a variety of foods, in preparing complementary food
- Introduce self feeding around 8 – 9 months

Most natural foods contain adequate amounts of salt & sugar. Taste for added salt & sugar is acquired. Introducing salt and sugar to complementary food should be avoided or delayed as much as possible. Reasons for avoiding salt and sugar are given in box 14.

Box 14
Reasons for avoiding salt and sugar

- Infants will develop a craving for salt and sugar as they grow older
- They find it difficult to excrete excess salt
- High sugar containing foods compromises the intake of nutritious food.
- High sugar content of food leads to decay of teeth
- Consumption of high sugar leads to obesity

Prevention of food allergies

Some foods when given during early life could lead to the development of food allergies which could manifest as eczema, asthma and hay fever. The risk of allergy is greater for those who have a family history of above illnesses. For these "at risk" infants, potential food allergens should be avoided as far as possible. It is advisable to delay introduction of foods such as cow's milk and milk products including infant formula milk, nuts, egg white and certain types of fish in those children.

Problems in complementary feeding

Nutritional inadequacy and contamination with pathogens causing diarrhoea are the main problems associated with complementary feeding.

Addition of excess water dilutes the food and will lead to low energy and nutrient density. Instead of adding water, initially mother can express and add breast milk to the food which will facilitate the feeding process and increase energy density. The infant will also find it easier to swallow and it enhances the taste and quality of food.

The infant's stomach is small. Hence only a small quantity of food can be taken at a time. Therefore, food with high energy density should be given to provide required energy (ref Table 3).

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 tea spoonful powder to the rice during preparation of the feed.

Table 3 – A feeding guide

Age in Months	Texture	Frequency	Amount
6+ - 8	Well mashed foods. Start with rice. Continue adding pulses, fish/sprat/meat, vegetables, green leafy vegetables, egg yolk etc	2-3 main meals per day plus frequent breast feeds. depending on child's appetite 1-2 snacks	Start with 2-3 table spoons full per feed and increase gradually upto ½ up of 200 ml bowl. 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 breast feeds. Depending on child's appetite 1-2 snacks may be offered	About ¾ of a tea cup at each meal
12 - 23	Family foods (chopped or mashed coarsely if necessary)	3-4 main meals plus breast milk after meals. Depending on child's appetite one to two snacks may be offered	One full tea cup or a bit more at each meal

How should I prepare the meals for my child at each age?

Table 4:
number of servings

Food group	7 - 9 months	9-12 months	1^{+}- 2 years	2^{+}- 5 years
Cereals	2 - 3	3 - 4	3 - 4	3 - 4
Breast milk	As desired	After meals as desired	after meals as desired	after meals as desired
Milk products e.g. curd, yoghurt, cheese	½ 1	1	1	1-2
Fish, meat and egg	1	1 - 2	1 - 2	2
Lentils, pulses, nuts	1	1	1 - 2	1 -2
Fruits	1	1 - 2	2	2
Vegetables	1	1 - 2	2	2
Fat based foods	1 tsp/meal	1-2 tsp/ meal	Small amount	Small amounts
Sugar based foods	nil	nil	A small amount of sweets after meal time	A small amount of sweets after meal time
In case of formula fed infants	500 – 600ml	500 – 600ml	2 Cups (400 ml)	2 Cups (400 ml)

Source: IYCF Guidelines, 2006

14 Children & adolescents should take an **adequate and nutritious diet**

Demand for nutritious food by children and adolescents remains high as they undergo a period of rapid growth. It is important to inculcate healthy feeding habits during this period of time to ensure optimum growth and development. These healthy habits will help to prevent many non communicable diseases (eg; diabetes, heart attacks, strokes, etc) during their adult life.

Healthy diet; 1-5 years

Children show a considerable variation in their individual nutrient requirements. It depends on gender, weight, height, age, activity level and genetic factors. They have a small stomach capacity and often-variable appetite. They require frequent meals with variety to meet high nutrient demand. Details of daily servings are given in Box 15. (refer to chapter 1 for serving sizes).

Box 15
Recommended number of daily servings for children 1-5 years

Food groups	servings
Cereals and starchy food	3-4
Fruit	2
Vegetables	2
Fish, pulses, meat, eggs, nuts	1-2
Milk or milk products	1-2

Moderate amount of grated coconut, coconut milk, oil, butter, margarine can be included. Limit sugar containing foods to desserts, in small amounts at meal times.

What are the specific nutrient needs?

Energy and protein:

Requirements are increased in accordance with age. Offer 3 - 4 main meals and 2 snacks daily. Meals should comprise of adequate amount of rice or other cereals together with fish, meat or eggs and vegetables.

Regular monitoring of weight and height is the best means of assessing whether energy intake is adequate.

Calcium: requirement is increased with age. Milk and milk products or small fish with bones should form an important part of the diet as it helps to full fill the high demand of Calcium (box 16).

Box16
Some good sources of Calcium

Fish,m eat,e ggs and Pulses

- dried *Kirigodeya*, *Kunissa*, dried Modha, *Karalla*, *kelawalla*, *kumbalawa*, sprats, canned fish, soy bean bean, chick pea

Milk or milk products

- milk, cheese, curd, and yogurt.

Dark green and other vegetables

- *Kathurumurunga*, Amaranth, curry leaves, drumstick (*murunga*) leaves , *mukunuwenna*, lotus stem, potato.

Fruits

- wood apple

Nuts and oil seeds

- Gingelly seeds.

Iron: The daily diet should comprise of foods of animal origin (fish, meat, egg.), pulses and dark green leaves, and it will ensure the supply of iron. Concomitant intake of vitamin C rich food will promote iron absorption (box 3 and 5).

Vitamins: Consuming a meal comprising of all food groups will ensure supply of required nutrients including vitamins.

Healthy diet for school age children (5-10 years)

During this period, child's growth continues gradually. As they go to school they need more energy to match their activity level.

- Have a healthy breakfast before going to school (a solid meal).
- Make sure that a healthy snack (box 10) is given at school interval.
- Limit consumption of high sugar, salt & fat containing foods.
- Continue offering food of wide variety for every meal.

Growth is assessed by evaluating the appropriateness of height for age and weight for height. It is done at school medical inspection.

Specific nutrient needs of adolescents (10 – 19 years)]

The adolescent period is characterised by the onset of puberty associated with rapid growth. During this period adolescent needs lot of energy, protein, calcium and iron to support the growth of bone and muscle. Girls need more iron rich food (box 5) than boys. High intake of calcium (box 16) and vitamin D rich food will increase the bone mineral density and help to postpone the onset of osteoporosis in old age. Box 17 provides the number of daily servings recommended from each food group.

Growth in this age group is assessed by body mass index and cutoff levels depend on age and gender. Assessment is done at school medical inspection.

Box 17
Recommended number of daily servings of adolescents

Food groups	servings
Cereals and starch food	7-10
Fruits	2
Vegetables	2-3
Pulses, fish, meat, eggs, nuts	2-3
Milk or milk products	2
Nuts & oil seeds	2-3

Nutrition problems in adolescents:

There is an increase trend of children and adolescents buying food from outside. This will lead to making of wrong food choices consisting of oily bakery products, soft drinks, savory and crisps, leaving little room for nutritious food thus contributing to nutrition related problems such as obesity and micronutrient deficiencies.

On the contrary some girls, in fear of excessive weight gain may limit their food intake resulting in wasting and nutritional deficiencies.

15 The elderly should **eat foods with high nutritional value**

Diet can make a significant positive contribution to the well being of an older adult. As a person ages, physiological changes may affect the nutrition status.

These include loss of lean body mass leading to decreased metabolic rate, changes in appetite, reduction in sense of taste and smell, reduced mobility, difficulties in digestion and absorption, reduced food intake and increased nutrient loss in disease states. These factors may result in under nutrition.

Over-weight may also be a problem among some older adults due to reduced physical activity and excess calorie intake over and above the requirement. The risk of malnutrition, to which older adults are more susceptible, can be avoided by paying proper attention to their food intake.

Nutrition requirements

Energy requirements can decline with age, particularly if their physical activity levels are limited, but the need for protein, vitamins (thiamin, riboflavin, vitamin B_{12}, folic acid, Vitamin D, vitamin C) and minerals (iron, calcium) remains the same. It is vital that they select nutrient dense food, which means that the food is rich in nutrients but low in calories. However you still need to eat a variety of foods to get all the required vitamins and minerals . It is even more important to be conscious with overweight or obese elderly people with regards to the energy intake. Adequate fluid intake is also essential for optimum health.

Sup ementation

Despite dietary advice, some older adults will not or can not consume adequate food to meet the nutrient requirements and may need supplementation. It should be taken on medical advice.

Overcoming potential problems in older adults through correct food practices

Loss of appetite, loss of teeth and malabsorption often reduce the variety of foods eaten and also reduces the bio-availability of nutrients. Softer, more digestible foods need to be eaten. This can be achieved through cooking and processing.

Extra care must be taken to increase the variety of foods by selecting foods from all food groups.

Constipt ion is more common in the elderly due to inadequate intake of dietary fiber, fluid and food, reduced physical activity or certain medications.

A gradual increase in fibre-rich foods (such as whole-grain cereals, fruit, vegetables and pulses) is needed together with plenty of liquid and increased physical activity. Laxatives should be taken only on medical advice.

Osteoposrosis (*thinning of bone due to loss of bone minerals, especially calcium*). The incidence of osteoporosis increases with age and occurs due to age-related bone loss, with post menopausal women being at greater risk than men. In such persons, bones become sufficiently fragile to fracture readily. Although an increased calcium intake cannot restore lost bone, an adequate intake should be maintained to prevent further loss of bone minerals. Small fish like dried or fresh sprats, milk or milk products are among the richest sources of calcium (Box 16). Staying as active as possible is important to maintain good bone strength and balance to prevent injury.

Anaemia is a common problem in elderly. Iron rich foods such as foods of animal origin containing haem iron, pulses, dark green leaves and folic acid rich foods such as fruits and green leafy vegetables should be consumed daily.

Healthy eating

Consume a variety of nutrient dense foods and beverages from the six food groups while choosing foods that limit the intake of saturated fats, cholesterol, sugars and added salts. Regular mealtimes' and avoiding skipping meals is a good practice. In situations where loss of appetite causes weight loss, energy density can be achieved through a moderate increase in fat, through cooking processes such as tempering. Plenty of liquids should be taken, with at least 6 – 8 glasses per day. If overweight, reducing energy intake can be achieved by reducing starchy foods, sugar, and fat, and replacing them with

fruits, vegetables and pulses, while maintaining the moderate intake of animal products, such as fish, milk and eggs. Avoiding alcoholic beverages and abstinence from smoking will be of great benefit to maintain a healthy life.

Physical activity and lifestyle

Participate in regular physical activities to reduce problems associated with aging.

Continuing the activities that you enjoyed doing will help to maintain physical fitness and mental wellbeing. An active lifestyle will help to prevent loss of bone mineral, muscle mass and muscle tone. Increased levels of physical activity are also important in preventing obesity and reducing the risk of lifestyle related diseases such as diabetes and coronary heart disease.

Further, being more active is a good way of improving social interactions. Maintaining activity will help to continue with the same energy intake without reducing further. This will also help in the intake of other nutrients as food intake could be maintained at same level. Encouraging to continue physical activity after minor illnesses helps in the recovery process and prevents further immobility.

16 Eat Clean and Safe Food

Certain micro-organisms which cause diseases are found in the environment. Food spoilage brought about by micro-organisms can lead to food deterioration or to food poisoning. Some micro-organisms change the appearance of food. Such deterioration generally change the colour, taste and consistency of the food and is easily detectable.

However, the smell, taste and appearance of food are not always good indicators of spoiled food and whether they would make you sick or not. It is therefore necessary to take certain precautions to have clean and safe food.

Cleanliness in food preparation

- The kitchen and its surroundings should always be kept clean and free from pets, insects and rodents.
- Kitchen waste should be discarded regularly as disease-causing germs could grow in them and also attract rodents, flies, and other insects.
- All surfaces, cleaning/wiping cloths and utensils, especially cutting boards and knives should be washed thoroughly after use. This is of particular importance when used to prepare fish, poultry or meat.
- People handling food should wear clean clothes and be free of wounds and sores.
- Nails should be cut short regularly. Washing hands with soap and water prior to preparing and eating food is important.
- It is essential to wash hands well with soap and water after using the toilet.
- Cooking utensils should be cleaned and dried after use. Germs grow in the presence of moisture. Clay pots should be dry as moulds could grow and contaminate the next meal prepared in them.

Selection of food

Select fresh and wholesome food for consumption. Raw foods should be washed thoroughly before cooking and/or consumption especially fruits and vegetables. Do not buy foods which are spoilt, mouldy or discoloured.

Fruits and vegetables

It is best to select seasonal fruits & vegetables. Clean, fresh, firm and bright fruits should be selected. To ensure freshness and minimum contamination take them from your home garden. Peeling the skin will help to remove some of the residues of chemicals applied. Cracked, wounded and fruits with discolored skin should be discarded. Those with holes and burrow marks with odour indicate insect infestation and should be discarded.

Fish

Select whole fresh fish with non sunken bright eyes. The skin would have a shiny, moist, firm appearance and the flesh would be firm to touch, not soft or mushy. Gills must be bright red in colour and cut fish also have red appearance. Fish should have no brown spots, which is an indication of the beginning to decay. Frozen seafood must be solid with no signs of partial thawing, in undamaged packaging and with no sign of freezer burn.

Meat & poultry

Select fresh meat of bright cherry red colour. When meat is exposed for some time, a chemical reaction occurs forming a brown pigment which is undesirable. Always buy lean cuts of meat with less fat.

Egg

All broken and cracked eggs should be discarded. Smelly eggs should not be taken. Heavy eggs are preferable to light eggs. When a fresh egg is put into the clean water, it should sink with the tip pointing upwards. Eggs should be washed properly before using for preparation.

Milk & milk products

Check the manufacture and expiry dates of milk & milk products before purchasing. If you buy pasteurized milk, select only refrigerated ones. Do not buy bottled sterilized milk that is stored outside the shop exposed to sunlight. Sunlight could destroy some of the important nutrients in the milk.

Do not buy yoghurt when its container lid appears bloated. When purchasing ice cream and other frozen desserts, make sure they are frozen solid and the container is not sticky or frosted.

Cereals, yams & nuts

A dangerous toxic chemical, aflatoxin is produced by a fungus which grows on peanuts, maize, cashew nuts, coconut and other seed crops harvested and stored under high humid conditions. Avoid eating discoloured and odd shaped nuts as they could be contaminated by fungal toxins. Avoid potatoes that are sprouting and green. Green signifies the presence of toxic alkaloids.

Packaged food

Do not buy food with damaged packaging e.g. dented or swollen cans, leaking containers, and packages with broken or imperfectly formed seals. Always look for the expiry date before purchasing food packed in containers. Do not use food after its expiry date even they look, smell and taste all right, as they could contain dangerous numbers of pathogens.

Food additives may be added to prevent spoilage, improve quality, taste, colour and texture. Preservatives are added to control growth of harmful microorganisms thus preventing food spoilage and poisoning. Give attention to the label. It displays the food additives and their E numbers (coding used for food additives) used in the food. Certain preservatives like sulphites, nitrites etc., could affect people sensitive to those chemicals.

Do not buy products which are meant to be chilled or frozen food, but are not so at the time of buying. These products need to be kept at low temperatures to minimize the growth of pathogens. Touch the packaging, particularly in supermarket freezers, to check whether they are still hard and cold.

Cook food thoroughly

Frozen meat and poultry should be thoroughly defrosted before cooking. Preparation of easily perishable foods must be carried out quickly. Food should be cooked thoroughly, especially meat, poultry, eggs and seafood to destroy the microorganisms. Consumption of raw eggs is not advisable due to possible salmonella contamination, and also there is a concern about the protein digestibility.
Soybean should be cooked thoroughly to obtain the benefit of its high protein content and should be soaked well to remove the flatulent.

Cooking food to a temperature of 70°C ensures safety for consumption. Use clay pots or stainless steel vessels to cook instead of aluminium vessels, as they react with the acids used in cooking.

Safe Storage

Store cans, packets and bottles in a cool dry place, protected from insect and rodent. It is best to buy fresh food for the day's consumption. To keep food for a longer time, keep under refrigerated or frozen conditions. The refrigerator should be kept switched on continuously throughout the day.

Store prepared food in clean, non-toxic, washable, fully covered containers to avoid contact with raw food. Do not store for long periods, even in the refrigerator.

Potatoes and onions should be kept in a cool, dark place. Onions should be kept away from potatoes as otherwise the gas emitted by the onions will make the potatoes sprout. Most of the vegetables & fruits are best kept in the fridge.

Cereals & pulses are best stored in dry, air tight containers away from light.

Raw food, especially meat, poultry and seafood, should be kept in the freezer compartment of the refrigerator. Cooked foods should be kept at the top shelve of the refrigerator to prevent contamination.

All fresh milk should be best stored at temperatures below 5^{o}C. Sterilized milk once opened should be kept in the fridge.

Freshly cooked food should be consumed within four hours or be refrigerated. Microorganisms can multiply very quickly if food is stored at room temperature. Hot food should not be put in the refrigerator, as this will cause the temperature in the refrigerator to rise and allow microorganisms to multiply. By holding food at temperatures below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped.

Refrigerated cooked food should be heated thoroughly at least at 70^{o}C before eating. Repeated refrigeration and heating should be avoided.

17 Eat naturally occurring foods in preference to processed foods

There is a rapid increase in the usage of processed food in Sri Lanka. Although the processed foods are expensive, the rapid changes in socio-economic status, especially with increased female employment and per capita income have made processed foods an option for some sections of the urban population.

What are processed foods?

Foods that are subjected to modifications either for preservation or for convenience are called processed foods. Many processed foods only need reconstitution and heating, before consumption.

Although processed foods may have benefits due to convenience, there can be drawbacks on nutritional quality. In addition, most of the processed foods contain food additives to improve the palatability and the shelf life. These additives may have little or no nutritive value and the preservatives may cause adverse health effects.

Not all processed foods are bad for health. Fresh-cut/ frozen vegetables, pasteurized milk, parboiled rice and fortified products are some of the popular processed foods, *which have more beneficial effects than adverse effects.*

Nutritive value and health effects of processed foods

Processed foods are generally made from refined ingredients and a majority of them are rich in added fat or salt/sugar and are calorie dense. Most of them are deficient in dietary fiber and micronutrients. Thus, caution needs to be exercised when processed foods constitute a major part of the menu.

Most of the processed products contain preservatives to inhibit the microbial spoilage and to retard fat rancidity. These preservatives can cause toxic or allergic reactions. Often processed foods contain flavour enhancing Monosodium Glutamate (MSG) and texture improving modified starches, which can cause allergic or toxic effects.

Many processed food contain large amounts of trans fats, saturated fats, sugar and salt. These types of foods should be avoided, or at least eaten sparingly.

Junk food

Junk food is an informal term used to describe foods with a limited nutritive value. It includes foods with a high content of sugar and fat and therefore high in calories, but low in nutrients. Snacks such as potato chips, sweet desserts, toffees, products of potato starch and carbonated and sweetened beverages are the main junk foods consumed in Sri Lanka. The term "empty calories" (High calories but low micronutrients) is also a term used to describe them as they do not supply protein, minerals or vitamins. Junk foods are popular due to their great taste, but one should know that their taste is owing to lavish usage of oils, salts and sugar.

Their use should be discouraged. High consumption of junk food is one of the leading causes for the soaring number of cases of type 2 diabetes, obesity, heart disease, and tooth decay.

Each food should be judged from the label on the package, which should give a list of ingredients in descending order. If suger, fat or salt is among the ingredients (found in the highest concentration), the food is better avoided. If one serving of the food provides more than 300 kilocalories avoid it, unless it forms the whole meal. *5g fat is equivalent to one teaspoonful of fat or oil.*

What are natural foods?

Food that has undergone minimal processing and contains no preservativesor artificial additives can be called as a natural food. It is widely accepted that natural food are far healthier.

The natural food undergoes only minimal physical processing, which will include activities such as, peeling, milling, grinding, steaming, cooking, frying, baking, drying, curing, refrigeration and freezing without any chemical additions. Therefore, all the natural goodness of the commodities is preserved. However, we have to be aware that consumption of raw foods are not the best option for nutrition and health, as there can be unacceptable constituents and contaminations in the raw food. Hence, consumption of natural food provides the better health benefits than the use of processed foods or raw foods.

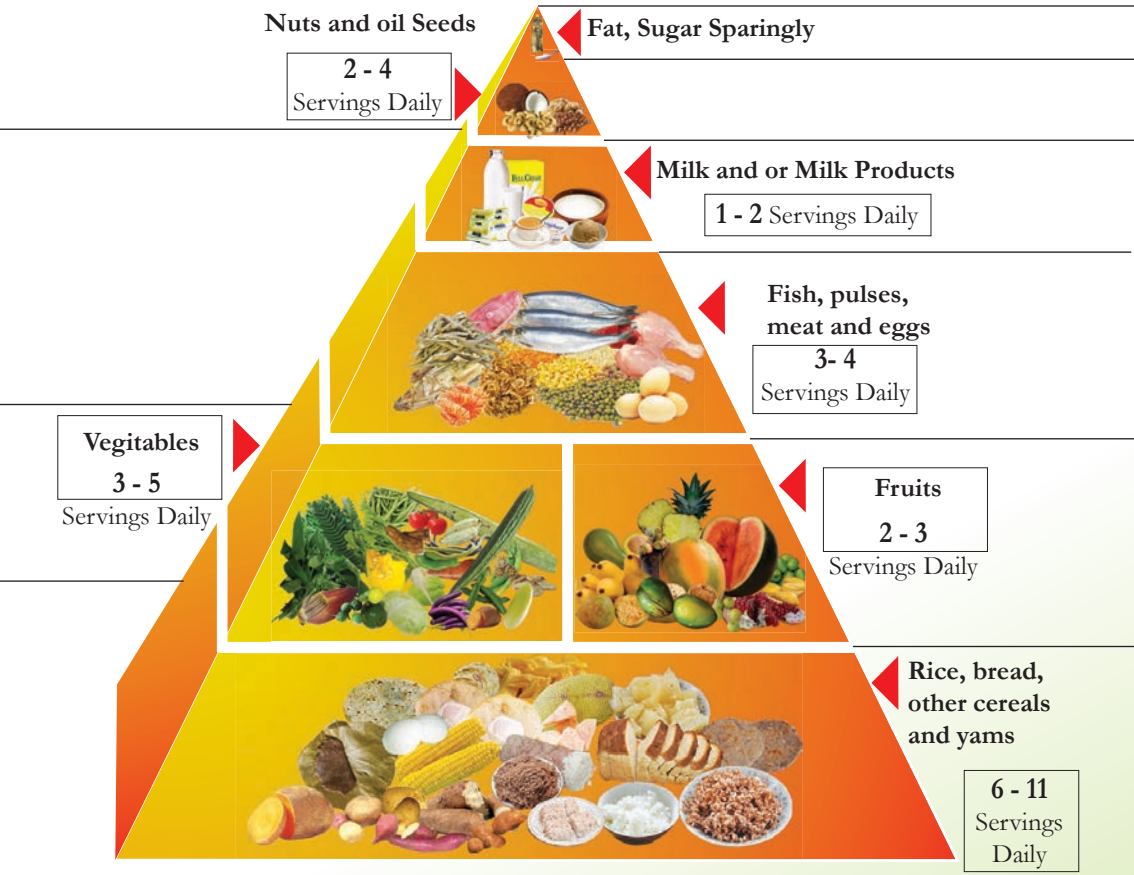
Nutritive value and health effects of natural foods

Since natural foods undergo minimal necessary changes the availability of the nutrients are very high. Also natural foods retain most of the dietary fibers of the ingredient material providing additional health benefits. There is a new global trend in the food

catering industry called as slow foods, which are mainly made from traditional commodities with minimal processing to retain the natural goodness of the food commodity. Slow foods can be considered as the opposite of the fast foods, with respect to the nutritional value and the glycemic impact of the diet.

Natural foods contain higher amounts of natural antioxidants. These natural antioxidants help to protect the body from oxidative damage induced by free radicals, which are linked with human diseases including cancer, cardiovascular disease, and aging. Also, some natural foods contain biologically active components, which provide therapeutic properties. These foods which provide health-promoting or disease-preventing property beyond the basic function of supplying nutrients are known as functional foods and their full benefit can be obtained by using them as a food rather than a supplement.

FOOD PYRAMID



Food Group	*1 Sev. equal to*
Rice, bread, other cereals and yams	
Fruits	
Vegetables	
Milk and / or milk products	
Fish, Pulses, meat and eggs	
Nuts and oil seeds	

Focal Point

Dr.U.M.M.Samaranayake
Director Nutrition
Ministry of Health

Editorial Committee

Dr. Renuka ∂yat issa
Consultant Medical Nutritionist
Medical Research Institute

Dr. Pujitha Wickramasinghe
Hony consultant Paediatrician &
Senior Lecturer in Paediatrics
Faculty of Medicine, Colombo

Dr. Senarath Mahamithawa
Deputy Director, Nutrition
Ministry of Health

Dr. Chandanee Withana
Nutrition Specialist
Ministry of Health

Working Group

Prof. Sagarika Ekanayake
Department of Bio Chemistry
Faculty of Medicine
University of Sri Jayawardenapura

Prof. Hemantha Senanayake
Professor of Gynaecology and Obstertrics
Faculty of Medicine, Colombo

Dr. Renuka Silva
Dean, Faculty of Livestock, Fisheries & Nutrition,
University of Wayamba

Dr.U.M.M.Samaranayake
Director Nutrition
Ministry of Health

Dr. Pujitha Wickramasinghe
Hony Consultant Paediatrician & Senior Lecturer in Paediatrics
Faculty of Medicine,
Colombo

Dr. Renuka Jayatissa
Consultant Medical Nutritionist
Medical Research Institute

Dr. D.BT. Wijeratne
Additional Secretary
Ministry of Agriculture

Dr. Senarath Mahamithawa
Deputy Director, Nutrition
Ministry of Health

Dr. Chandanee Withana
Nutrition Specialist
Ministry of Health

Dr. Angela de Silva
Nutrition Specialist & Senior Lecturer
Faculty of Medicine, Colombo

Dr. Pulani Lanerolle
Nutrition Specialist & Senior Lecturer
Faculty of Medicine, Colombo

Prof. Narada Warnasuriya
Consultant Paediatrician

Prof. Chandrani Liyanage
Professor of Community Medicine
Faculty of Medicine, Karapitiya

Mrs. Chalani Ilangamge
Nutritionist
Ministry of Health

Mrs. Malini Mallawarachie
Food Technologist
Food Advisory Committee

Contributors

Dr. Mahen Wijesooriya
President
Diabetes Association of Sri Lanka

Dr. Shiromi Pilapitiya
Medical Officer
Sports Development Department
Ministry of Sports

Dr. Uditha Bulugahapitiya
Consultant Endocrinologist
Colombo South Teaching Hospital

Dr. Chandrani Piyasena
Nutrition Specialist

Ms. Vishaka Tillekeratne
Consultant
World Bank

Mrs. Damitha Rajapaksha
Senior research officer
Industrial Technology Institute

Dr. Hiranya ∂yaw ickrama
Consultant Community Physician
Family Health Bureau

Dr. Sujeewa Ariyawansa
Head
Post harvest Technology Division
National Aquatic Resources Research & Development Agency

Ms. Pamoda Gunaratne
Nutritionist
Ministry of Health

Mrs. Chalani Ilangamge
Nutritionist
Ministry of Health

Mrs. Sajeewani Mirihagalle
Food Technologist
Ministry of Health

Mr. T.R.N.M.Liyanaachchi
Government Analysist

Dr. Ayesha Lokubalasooriya
Consultant Community Physician
Family Health Bureau

Dr. Jayantha Jayatissa
Co-ordinator - Food and Nutrition Unit
University of Kelaniya

Ms. Chandi Yalegama
Head
Research and Development
Coconut Research Institute

Ms. Deepika Munaweera
Assistant Director
Sri Lanka Standards Institute

Dr. Nimal Priyankarage
Veterinary Research Institute,Gannoruwa

Mr. Jagath Dayarathne
Planning & Programing Assistant.
Ministry of Health

Mr. E. Araskumar
Development Assistant.
Ministry of Health