

Prevention of lifestyle diseases

Learning objectives

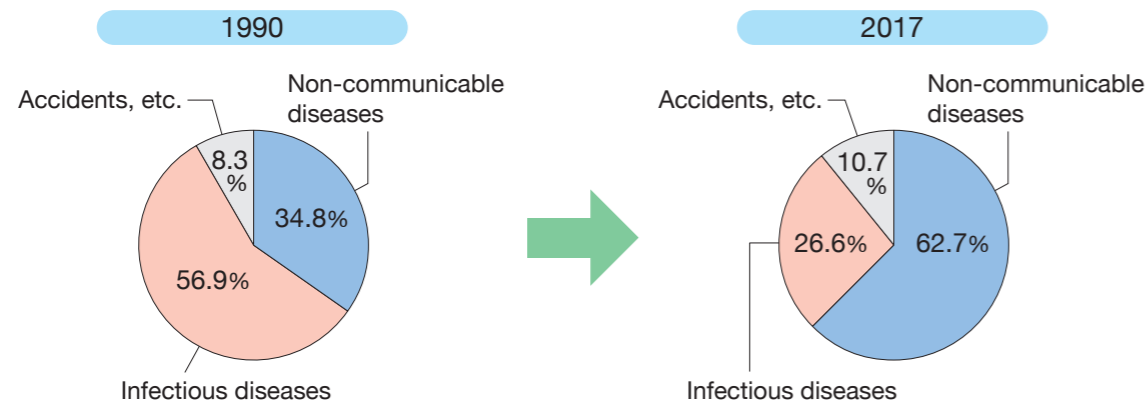
You will be able to gain proper understanding and explain:

- The current situation surrounding lifestyle diseases in Cambodia.
- How obesity affects a person's health.
- The importance of diet/nutrition in the prevention of lifestyle diseases.
- Factors to help one acquire healthy lifestyle habits.
- Health problems that stem from an improper diet.

In this chapter, you will learn about the relationship between lifestyle diseases and lifestyle habits. Specifically, we will cover lifestyle diseases that are common in Cambodia, and basic lifestyle habits and diet/nutrition as contributing factors to the diseases.

1. Common lifestyle diseases among Cambodians

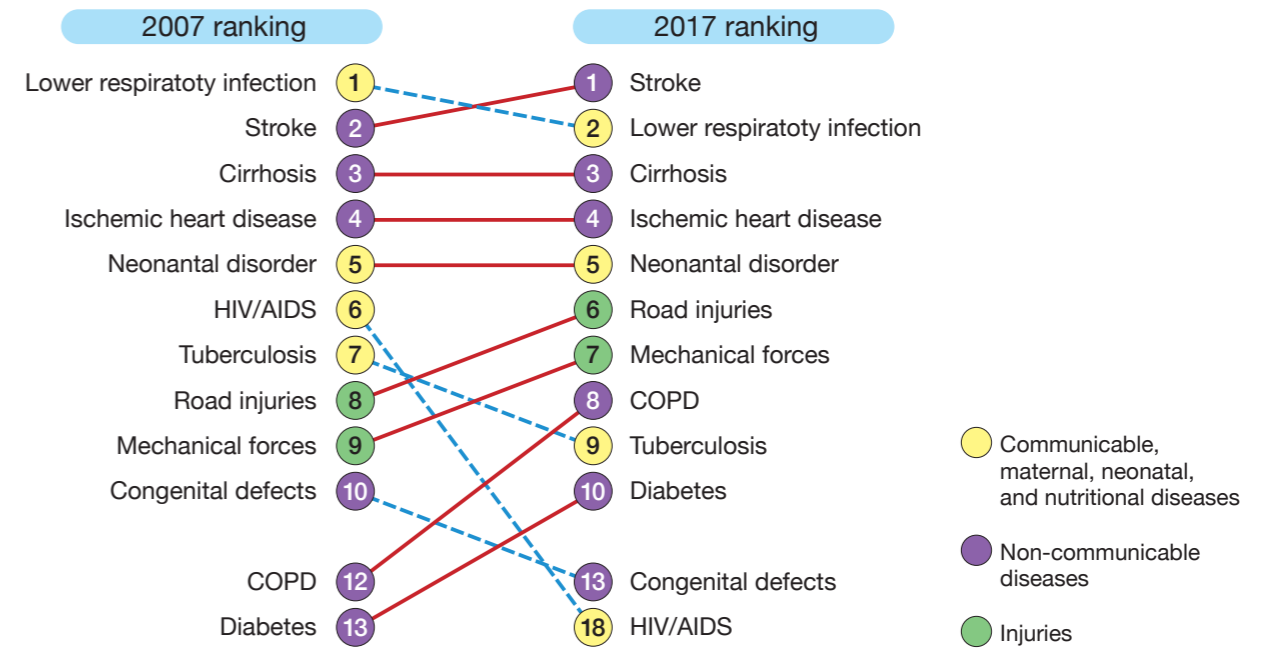
Around 30 years ago, Cambodia had a high mortality rate caused by infectious diseases. While the country has since seen declines in the proportion of infectious diseases-related mortality thanks to improved hygiene and nutrition, the proportion of **non-communicable diseases (NCD)-related mortality** has surpassed 60% (Figure 6.1)¹. In particular, what are known as **lifestyle diseases**, such as stroke, liver disease, heart disease, cerebrovascular disease, malignant neoplasms (i.e. cancer), and diabetes, are now among the leading causes of death (Figure 6.2). Among the **risk factors for death and disability** due to such diseases, factors related to human behaviors and metabolism figure largely;



Source: Ministry of Economy, Trade and Industry. "International Healthcare Development Country Report: Cambodia"¹

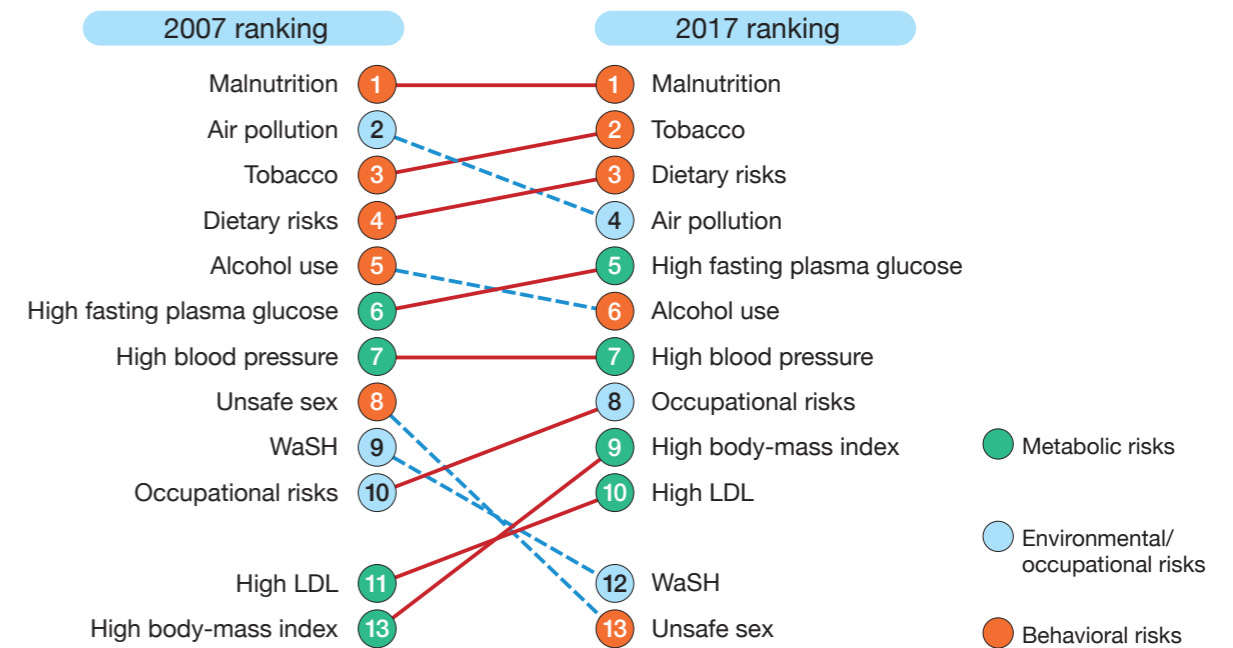
Figure 6.1 Changes in causes of deaths over time in Cambodia (1990–2017)

specifically, factors related to lifestyle habits such as diet and exercise, rest, and labor, and abnormal health conditions (e.g. smoking, diet, alcohol use, obesity, occupational risks, fasting hyperglycemia, hypertension, and high cholesterol) have become problematic (Figure 6.3)².



Source: Institute for Health Metrics and Evaluation. Cambodia - What causes the most deaths? <http://www.healthdata.org/cambodia>

Figure 6.2 Changes in causes of deaths over time in Cambodia (2007–2017)²



Source: Institute for Health Metrics and Evaluation. Cambodia - What risk factors drive the most death and disability combined? <http://www.healthdata.org/cambodia>

Figure 6.3 Changes in risk factors for death and disability over time in Cambodia (2007–2017)²

2. Lifestyle diseases and other conditions related to lifestyle habits

1) Lifestyle diseases

Table 6.1 shows a list of common lifestyle diseases and their symptoms. **Cerebrovascular disease** is a collective term for diseases caused by abnormality of arteries in the brain, with stroke being a commonly known form. **Liver disease (hepatitis)** involves inflammation of the liver, and possible causes include hepatitis virus infection, alcohol use, and obesity. **Heart disease** includes angina and myocardial infarction, which are caused by reduced blood flow or the formation of a blood clot in coronary arteries of the heart. A **malignant neoplasm** is an out-of-control growth of diseased cells (**cancer cells**) within a human body. Cancer cells are a mass of diseased cells, which were originally normal cells that turn into cancerous cells when their genes are damaged. **Diabetes** is a disease in which the bodily function that

Table 6.1 Common types of lifestyle diseases and their symptoms

Type of lifestyle disease	Symptoms
Cerebrovascular disease	A collective term for diseases caused by abnormality of arteries of the brain. Stroke is a commonly known form. Stroke has two main types: diseases caused by a blockage or rupture of the brain blood vessels. The former refers to cerebral infarction , in which a blockage of a blood vessel prevents blood from flowing into the brain, depriving the brain of oxygen and nutrients. This leads to the necrosis of neurons in the brain, which may cause a range of damage. The latter form of cerebrovascular disease includes subarachnoid hemorrhage and brain hemorrhage , in which a rupture of an artery in the brain causes bleeding into the brain. The blood that leaks out puts pressure on the neurons in the brain and causes damage. Symptoms include headache, paralysis of limbs, speech difficulty, and decreased level of consciousness.
Liver disease (hepatitis)	Liver disease (hepatitis) involves inflammation of the liver. Its possible causes are hepatitis virus infection, alcohol use, and obesity. Symptoms include loss of appetite, malaise, nausea, vomiting, and jaundice.
Ischemic heart disease	Ischemic heart disease includes angina and myocardial infarction . Angina is a condition where arteriosclerosis narrows the coronary arteries of the heart and obstructs the blood flow (Figure 6.4), resulting in repeated seizures accompanied by transient pain. Myocardial infarction refers to a condition where formation of clots in a blood vessel of the heart due to arteriosclerosis causes occlusion of the blood vessel, resulting in necrosis of myocardial cells. Delays in treatment can be fatal, and prompt medical attention is required.
Malignant neoplasm (cancer)	A malignant neoplasm (cancer) is a disease in which normal cells turn into diseased cells (cancer cells) and grow in an out-of-control manner (Figure 6.5). Cancer cells may form in different organs including the lungs, liver, uterus, and breast, and may grow, expand and spread to other organs, a process called metastasis. Symptoms vary depending on the site of the cancerous organ.
Diabetes	Diabetes is a disease in which the insufficiency or impaired action of insulin, which reduces blood sugar, causes a decline of the bodily function that suppresses the elevation of blood sugar levels, leading to chronic high blood sugar. There are type 1 and type 2 diabetes . Type 1 diabetes involves destruction of insulin producing cells due to autoimmune diseases and requires self-injection of insulin. Type 2 diabetes develops due to certain genetic factors combined with certain lifestyle habits such as overeating and physical inactivity. It may worsen without subjective symptoms, and raise risks for the three main complications, namely retinopathy, nephropathy, and neuropathy, as well as for progression of arteriosclerosis in larger vessels which may lead to heart diseases or stroke.

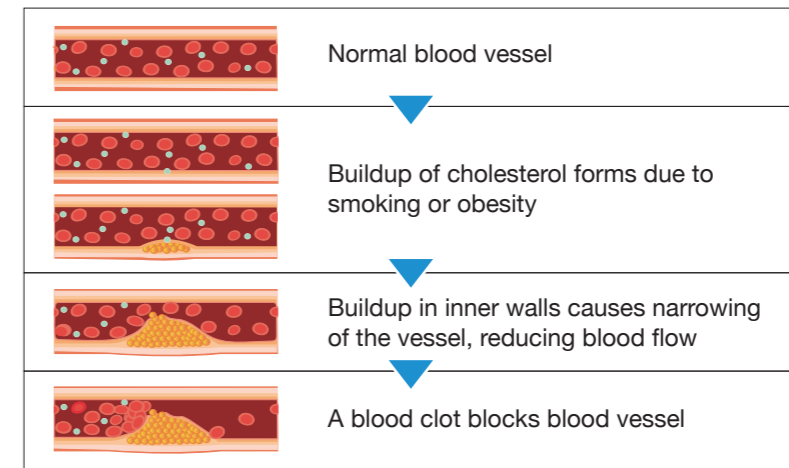


Figure 6.4 Development and progression of arteriosclerosis

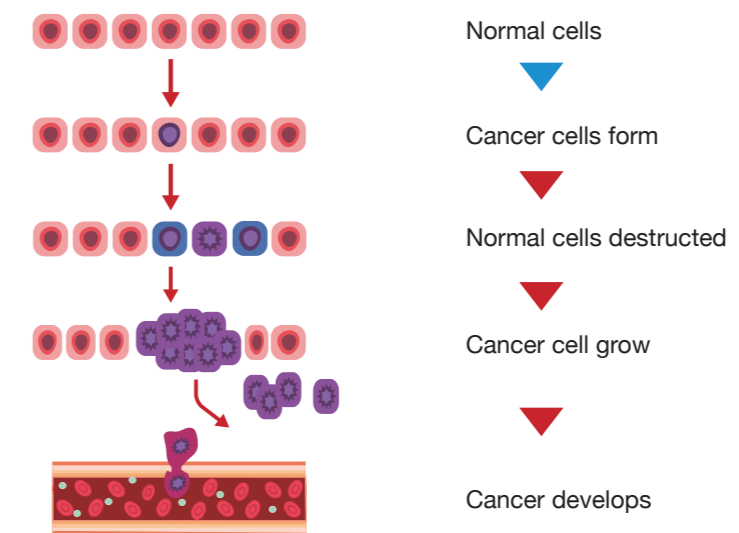


Figure 6.5 Process of carcinogenesis

suppresses the elevation of blood sugar levels is reduced, leading to chronic high blood sugar and causing a number of complications.

Another lifestyle disease is **periodontal disease**. Periodontal disease is an inflammatory disease caused by bacterial infection of the gums (**Figure 6.6**). When the gap between the teeth and gums is cleaned insufficiently, plaque may build up, allowing numerous bacteria to linger. The margins of the gums may be reddened or swollen due to inflammation, although pain is absent in many cases. If it progresses, the gap between the teeth and gums, called a **periodontal pocket**, becomes deeper, and the foundation of the teeth (alveolar bone) breaks down, ultimately requiring tooth extraction. Furthermore, toxic substances that form as a result of inflammation can enter into general circulation via blood vessels of the gums, causing various diseases or worsening pre-existing conditions.

Risk factors for periodontal disease include oral environments such as plaque, tartar, misaligned teeth, and smoking, as well as lifestyle habits that may decrease the body's resistance to diseases such as poor eating habits, stress/fatigue, physical inactivity, and lack of sleep. To prevent periodontal disease,

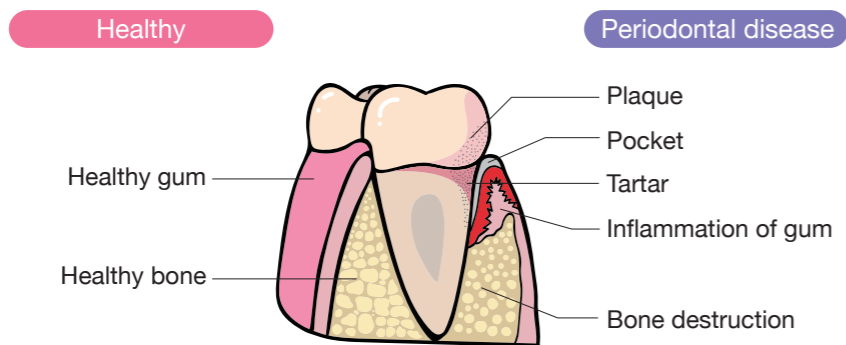


Figure 6.6 Periodontal disease

it is therefore important for one to reduce or refrain from alcohol and tobacco use, keep regular hours, avoid stress, and keep a balanced diet, as well as brushing one's teeth properly every day to keep the surface of the teeth clean and free of plaque. It is also effective to have one's teeth cleaned by a dental specialist on a regular basis to maintain the health of one's teeth, as it will remove tartar completely, even inside the gums, and clean the dental root, making the surface smooth and ridding it of bacteria that cause inflammation. In addition, the treatment of damaged gums and bone will help restore the gums close to a healthy state. For details on dental health, see Chapter 8.

Column: What is inflammation?

Inflammation is a bodily reaction to damage to biological tissues or cells caused by an injury, disease, or noxious stimulation, as a means of removing the damaged parts and helping regeneration. It is a reaction necessary for a human body to restore its health. Major stimuli (causes) of inflammation include: biological stimuli due to the invasion of a pathogen (bacteria, viruses, parasites, etc.; see Chapter 7); physical stimuli such as ultraviolet, light radiation, or high or low temperatures; and chemical stimuli such as acid and alkali. Common symptoms include reddening, swelling, fever, pain, and the inability to move the affected part. Inflammation may be acute, meaning it subsides in a short period of time, or chronic, when the symptoms are prolonged. The acute phase of inflammation is dominated by a type of white blood cell called neutrophils, while lymphocytes and macrophages are at play in the chronic phase (See Chapter 7).

Column: Plaque and tartar

Plaque is a sticky substance, white or yellowish white in color, that is found on the surface of a tooth. It is a mass of numerous bacteria, as many as 100 million per 1 mg. A cavity-causing bacterium called **Streptococcus mutans** is prone to adhere to teeth, forming stiff plaque.

Tartar is a calcified form of plaque. It is a mass that is hard as a stone and tends to form between teeth and the gum ridge. It often contributes to the development of cavities, halitosis, and periodontal disease.

2) Other health issues related to lifestyle habits

(1) BMI-mortality relationship

In all causes of death, the **BMI-mortality relationship** among Japanese men demonstrates a **reverse J-shaped curve** when plotted on a graph (Figure 6.7.1).³ This graph shows that when men whose BMI are between 23 and <25, their mortality risk is assumed to be 1.0 (the reference value), and then shows how many times the mortality risk increases for those who have lower or higher BMI than the reference value. For example, the mortality risk of men with BMI of 30 or higher is 1.42 times higher than those with BMI of 23 and <25. Japanese men whose BMI are between 23 and less than 30 are shown to have low risk of mortality from all causes compared those with other ranges of BMI. That is the optimal range of BMI for Japanese men.

The BMI-mortality relationship among Japanese women demonstrates a U-shaped curve (Figure 6.7.2).³ This graph indicated that, taking into account mortality risk from all causes, the optimal range of BMI for Japanese women is between 21 and less than 27.

It should be noted, however, that BMI, or **body mass index**, is calculated based on a person's height and weight, and does not tell whether the person is muscular or has excessive fat. "**Latent obesity**," or normal BMI combined with a high body fat percentage, is found among young women. Although there are body fat scales available for purchase, different models may employ different methods of estimation or criteria, which makes it difficult to take an accurate measurement of body fat percentage. You can use trends in body fat percentage as one indicator for obesity, keeping in mind that it has a margin of error.

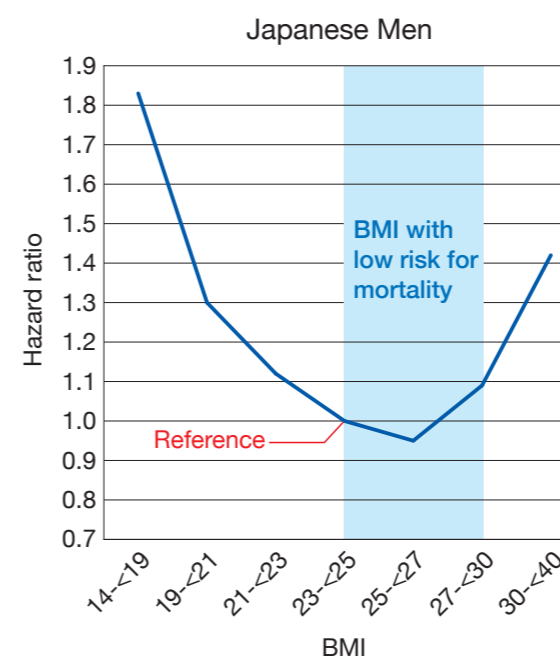


Figure 6.7.1

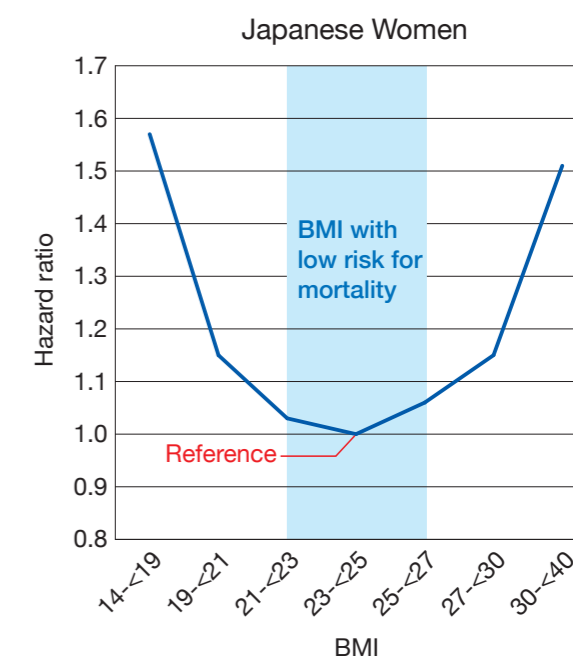


Figure 6.7.2

This figure is created using the data published in Sasazuki S. et al. Body Mass Index and Mortality From All Causes and Major Causes in Japanese: Results of a Pooled Analysis of Large-Scale Cohort Studies. Journal of Epidemiology. 21(6) 417-430. 2011. <http://doi.org/10.2188/jea.JE20100180>

Figure 6.7 Association between Body-Mass Index and Risk of mortality from all causes³

(2) Obesity and underweight

Obesity is a condition in which a person's body has an excessive accumulation of body fat. Because it constitutes a risk factor for respiratory, cerebrovascular, liver, and heart diseases, as well as for diabetes, prevention and control of obesity plays an important role in building health. **Body mass index (BMI)** is used to determine the level of obesity.

Being underweight, meanwhile, is a condition in which a person's body has low body fatness. Many young women may have an unbalanced diet or repeat extreme dieting despite the fact that they do not need to lose weight, and this raises health risks associated with dieting. An unbalanced diet owing to the wrong eating habits, in particular, may cause **iron deficiency anemia** or **osteoporosis**, which are detrimental to one's health. When it becomes serious, it may lead to **anorexia** or **bulimia**. Both anorexia and bulimia are forms of **eating disorders**. The former is estimated to affect in many cases people in their adolescence and early adulthood, when they avoid eating for fear of becoming fat, which causes them to become extremely thin. The latter involves repetitive episodes of overeating a few times a week over a period of months combined with inappropriate compensatory behaviors to avoid gaining weight (i.e., vomiting, use of a laxative). If such eating disorders become chronic, they may cause a number of forms of health disturbance, including **amenorrhea**, hypotension, and arrhythmia.

Column: Health information obtained based on body height and weight

BMI is calculated based on a person's height and weight. According to the WHO standards, a normal BMI is 22.0 for both men and women, and those with a BMI of below 18.5 are classified as being underweight, and 30 and above, obese (Table 6.2). BMI is an indicator meant for adults; the Kaup index and the Rohrer index are used for infant and school children, respectively (See Chapter 9 to learn about the calculation).

$$\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$$

Table 6.2 BMI and Nutritional status

BMI	Nutritional status
Below 18.5	Underweight
18.5–24.9	Normal weight
25.0–29.9	Pre-obesity
30.0–34.9	Obesity class I
35.0–39.9	Obesity class II
Above 40	Obesity class III

Source: WHO region office for Europe, Body mass index-BMI.⁴
<https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>

(3) Anemia

Anemia is a condition in which the amount of hemoglobin and the number of red cells in a given volume of blood fall below standard levels. When one has anemia, they may experience symptoms such as **facial pallor**, fatigue, general malaise, headache, palpitation, shortness of breath, loss of appetite, and in the cases of children, the impairment of intellectual development as well as learning or motor problems due to poor concentration. This is because a primary role played by **red blood cells**, which are a component of blood, is to transport oxygen and nutrients throughout the body, and any impairment to this function affects the brain the most out of all organs. A key to the delivery of oxygen is **hemoglobin**, which is a component of red blood cells. Hemoglobin is rich in iron, and it carries oxygen when iron binds to oxygen.

Adolescence in particular is a phase when one's consumption of iron increases as one goes through growth or menstruation, which often causes **iron deficiency anemia** due to a lack of iron as a component of hemoglobin. Poor nutrition also causes iron deficiency anemia. Dietary iron is found in two forms: heme iron, which is present in large amounts in animal-based products such as meat, and fish, and non-heme iron, which is present in vegetables and grains (Figure 6.8). Heme iron is known to be more well-absorbed than non-heme iron. For the prevention of iron deficiency anemia, it is recommended that one takes animal products that are rich in heme iron. Vegetables, legumes, and other common plant-based products that are rich in non-heme iron, meanwhile, can also have better iron absorption when combined with vitamin C-rich vegetables and fruits. One therefore needs to take both heme and non-heme iron in a balanced manner.

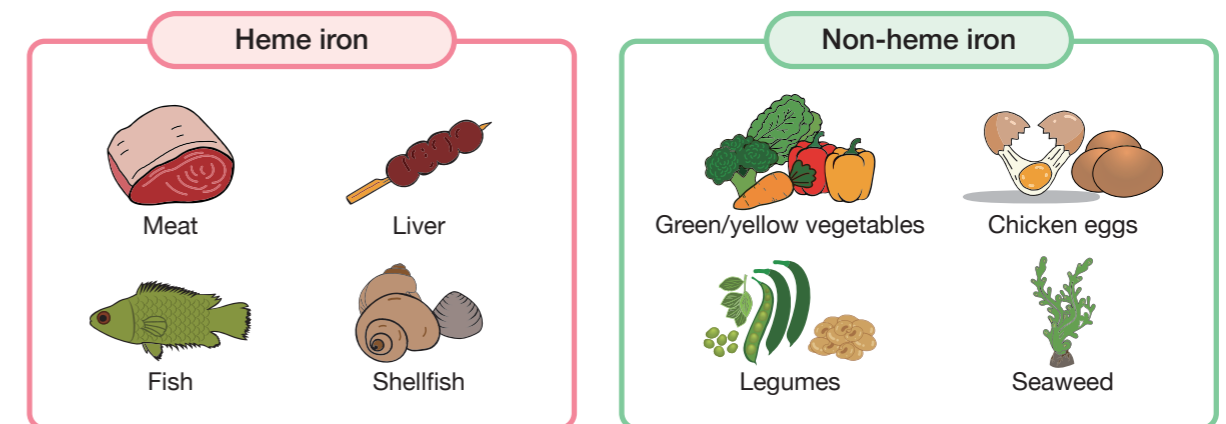


Figure 6.8 Main dietary sources of iron

Column: Cambodians and anemia

Anemia represents a serious health issue in Cambodia. Prevalence of anemia in the country is approximately 56% among children under 5 years of age, and approximately 45% among women 15–49 years of age⁵. Possible causes of anemia in Cambodians, other than simple iron insufficiency, may include deficiencies of zinc or folic acid deficiency, parasite or malaria infection, and pregnancy. Anemia caused by these factors may not be improved by the intake of dietary iron or iron

supplementation alone (Table 6.3)⁶. While use of the **Lucky Iron Fish**⁷ and fish sauce fortified with an iron compound⁸ have been known to improve dietary iron deficiency anemia, the Lucky Iron Fish was reported to have been ineffective in the cases of anemia due to non-dietary causes such as genetic hemoglobin disorder⁹. It is therefore important that one keep a balanced diet. Other possible approaches to alleviate or prevent anemia include parasite control using vermicides, proper malaria prevention and treatment measures, and family planning that suits individuals.

Table 6.3 Non-iron-related causes of anemia in Cambodia

Zinc deficiency	Deficiency of zinc makes the erythrocyte membrane more vulnerable to damage, which causes the red cell count to decline.
Folic acid deficiency	Folic acid is essential for hematopoiesis, and its deficiency inhibits production of normal red blood cells.
Parasite infection	If hookworms are attached to the intestinal mucosa for a prolonged period of time, it causes chronic blood loss, resulting in anemia.
Malaria	Malaria parasites proliferate inside the body and infect and eventually destroy red blood cells. (See Chapter 7 to learn more about malaria)
Pregnant women	Expecting mothers require iron and other nutrients in greater amounts than normal. Short inter-pregnancy interval puts greater strain on a mother, raising the risk for anemia. Pregnancy and delivery by a teenager, who is still in a period of growth herself, can also be more susceptible to anemia.

3. Prevention of lifestyle diseases and diet/nutrition¹⁰⁻¹²

1) Acquiring desirable lifestyle habits

A normal rhythm of everyday life often means that one eats three times a day. It is desirable that one acquires a habit of eating a regular and balanced diet, keeping lifestyle disease prevention in mind as a part of daily life. Being mindful of one's every meal every day helps maintain healthy lifestyle habits.

The human body is inherently equipped with a system that works to maintain **homeostasis**. For instance, if one eats snacks that are high in sugar and fat, levels of sugar and triglyceride or cholesterol in the blood increase. Such increases are a normal bodily response, and they return to the levels before the intake of such snacks. If undesirable lifestyle habits or disturbance to a rhythm of everyday life harms the system that maintains homeostasis, however, it may cause a situation where the blood sugar or triglyceride levels elevated by food intake take much longer to return to normal, with these levels remaining high even when one has not eaten.

A balanced diet is a diet that allows one to take in just the right amounts of nutrients they need to maintain their health. To maintain homeostasis, it is important for one to acquire a habit of eating a balanced diet. However, it takes some time for us to see whether or not our diet is right as the latter manifests in the form of abnormal physical conditions. In other words, people are not quick to realize it when their diet is not appropriate. This is what makes dietary habits one of the factors for lifestyle diseases. Continuation of an inappropriate diet exposes a human body to an inadequate supply of nutrients for a prolonged period of time. Many cases of type 2 diabetes, dyslipidemia, and hypertension, for instance, are attributable to inappropriate dietary habits. Development of these diseases constitutes risk factors for ischemic heart diseases and cerebrovascular diseases.

To help one take in the right amounts of necessary nutrients, it is effective to use the **Cambodian Food Pyramid** (see Chapter 5) as a guide to appropriate food intake. The pyramid classifies foods into different groups according to their characteristics. When using the Cambodian Food Pyramid to track one's dietary nutrient intake, it is preferable to do so over the span of one week or similar, rather than judging whether or not the intake is appropriate based on a meal-by-meal or day-by-day basis.

In addition, it is critical to have children acquire good dietary habits in their infancy and early childhood, and children need to learn about the **Cambodian Food Pyramid** and the **Seven Key Messages** during their school-age years (see Chapter 5). Since lifestyle habits of school-age children depend largely on parent education, it is also important to communicate with parents and guardians. In school education, it is desirable to have students/pupils gain understanding of the characteristics of foods that are consumed frequently in each region of Cambodia, and have them acquire knowledge on nutrition, such as what to eat and how much to eat to maintain an appropriate nutrition status. To this end, it is effective to provide opportunities to try actual food and meals by offering experiences such as observing foods being sold at a market or store, eating at a restaurant, growing crops at school or home, and cooking the crops they have grown by themselves, or making use of audiovisual learning materials.

2) Importance of healthy proteins

Proteins are found in nearly all foods, regardless of whether they are plant- or animal-based. They are degraded by multiple digestive enzymes in the digestive tracts into **amino acids** for absorption. Once absorbed, the amino acids are converted into a variety of different substances based on genetic information and biological state, and serve as an energy source or building material for biological structures. In addition, amino acids play important roles to synthesize proteins, which produce enzymes, hormones, neurotransmitters, immune cells and antibodies, various receptors, or transporters. Thereby, the proteins regulate bodily functions and maintain immune function, contributing to preserve bodily resistance (see Chapter 5).

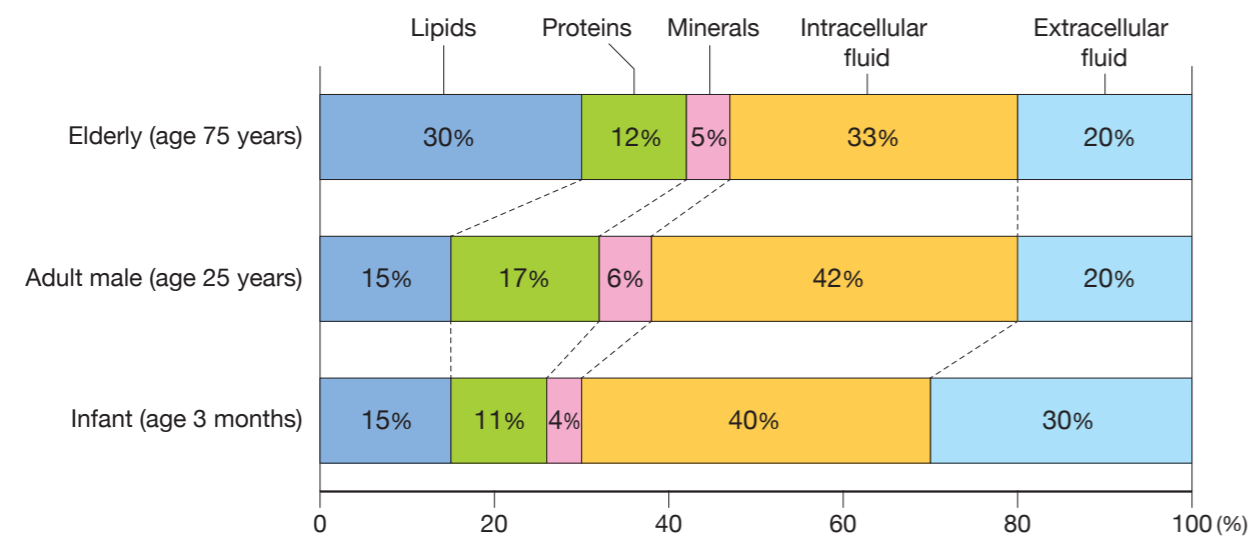
While there are 20 amino acids that are body constituents, nine of them cannot be synthesized in the body. These nine are called **essential amino acids**, and humans must take them in the form of dietary protein. If one's diet consists predominantly of a single type of food, it is difficult for them to cover all essential amino acids. It is therefore necessary for one to maintain a balanced intake of meat, seafood, eggs, and legumes, in addition to grains as a staple food.

4. Acquiring a better rhythm of everyday life

1) Maintenance of biological homeostasis

Homeostasis is a bodily function, or a process of biofeedback, with which a living body maintains a constant internal environment and sustains life activities by responding to environmental changes (see also Chapter 2). A living body has mechanisms that maintain homeostasis, such as regulation of body temperature, body fluid osmolality and pH, the concentration of glucose in blood, and blood pressure. For instance, the body temperature of a healthy human being is maintained at 36–37 degrees Celsius regardless of external temperatures. Likewise, a person's concentration of glucose in blood is maintained within the normal range even right after meals or when they have not eaten. By having these mechanisms work in concert to keep an optimal condition for the individual, a living body is able to sustain life activities.

Figure 6.9 shows the main composition of a human body. Approximately two-thirds of a human body is water, of which two-thirds is the intracellular fluid and the remaining one-third extracellular fluid. Intracellular and extracellular fluids normally have the same fluid density because homeostasis is at work to induce osmotic transport of water. In addition, intracellular and extracellular fluids contain a number of substances required for a living body to sustain life, and they exchange substances via cell membrane to ensure the cells work properly. For instance, key substances found in extracellular and intracellular fluids are electrolytes, including sodium ions (Na^+), chloride ions (Cl^-), and phosphate ions (HPO_4^{2-}) in the former, and potassium ions (K^+), calcium ions (Ca^{2+}), and magnesium ions (Mg^{2+}) in the latter.



This figure is a modification of the original in “Oku T, & Yamada K (Eds.), *Basic biochemistry*, 2nd ed. Nankodo, 2014¹⁰ and its 3rd ed. published in 2019¹¹.”

Figure 6.9 Composition of the Human body

2) Biological clocks

The earth rotates once every 24 hours approximately. Living organisms on earth have bodily systems that reflect changes in photoenvironment that repeat in a 24-hour cycle. This is called a **circadian rhythm**, in which their **biological clocks** regulate sleep, hormone release, body temperature, blood pressure, and enzymatic reactions (i.e., chemical reactions such as digestion, degradation, absorption, and metabolism induced by enzyme activity). If a circadian rhythm is out of form or is disrupted, it has mental and physical consequences; if the rhythm is not restored, it may induce sleep disorders, lifestyle diseases, or psychiatric illness (see also Chapter 2).

Humans eat and are active during the light period (i.e., when it is light during daytime) and sleep during the dark period (i.e., when it is dark during nighttime, etc.). The chemical reactions and hormone releases in the body are regulated according to this shift of behaviors. Regular hours and desirable lifestyle habits accord with this innate biological rhythm and play a role in preventing diseases.

3) Lifestyle habits to maintain a normal biological rhythm

To maintain the inner environment of a living body, many organs work in coordination, including the immune autonomic, and endocrine systems. For instance, the concentration of glucose in blood is regulated to be always within the normal range. This is achieved by the pancreas releasing **insulin** in response to elevation of blood sugar, with insulin promoting the cellular uptake of glucose. Diabetes is a condition in which insulin fails to work properly, leaving the blood sugar level out of control and increasing beyond the normal range, which results in an excessive amount of glucose in urine. There are two causes for insulin to fail to work: reduced insulin secretion, and insulin resistance. The former may occur when insulin output by the pancreas is already low to begin with, or it becomes lower as a result of aging or genetic reasons. The latter means that insulin has become less active even when its output is sufficient. If a person becomes obese due to irregular dietary habits and physical inactivity, insulin becomes less active.

To maintain homeostasis, daily lifestyle habits play an important role. Not only does eating at regular hours sate one's hunger and supply the body's need for nutrients, but it is also an activity that is necessary to regulate enzymatic reactions and maintain homeostasis. Besides diet, regular bowel movements and desirable sleep habits are also important. Some hormone release and enzymatic reactions may subside when the body is resting and energy consumption is low, while others may increase. Growth hormones are important during periods of growth, and their secretion is promoted during sleep at night. While sleeping, one's hormone release and enzymatic reactions associated with the digestion and absorption of nutrients are reduced, so that the body stores the nutrients and saves energy. This well-orchestrated regulation allows a living body to sustain life activities without running out of energy. Regular lifestyle habits are important activities in order for a living body to maintain a normal biological rhythm and maintain biological homeostasis.

Column: Environmental stimuli, homeostasis, and autonomic function

Humans are exposed to various environmental stimuli, including physical stimuli such as heat, ultraviolet light, and noise, biological stimuli such as those caused by bacterial infection, chemical stimuli caused by drugs, and psychological distress such as stress from peer relationships, hardships of life due to financial reasons, and violence (see also Chapter 12). When one is exposed to such stimuli for a prolonged period of time, their biological homeostasis may become imbalanced, putting their health at risk. As discussed in Chapter 2, the autonomic nervous system has two divisions, namely the sympathetic and parasympathetic nervous systems, and they control the blood pressure, heart rate, body temperature, digestion, metabolism, perspiration, excretion, sexual arousal processes. When the body is continuously subjected to environmental stimuli, this autonomic regulation may be disturbed, potentially resulting in homeostatic imbalance. This causes certain symptoms to manifest in mental and physical ways, such as tiredness, constipation or diarrhea, headache, dizziness, palpitation, and feeling of depression. It is therefore necessary to pay ample attention to stimuli from the environment in addition to keeping regular lifestyle habits, in order to maintain homeostasis and good health.

5. Improper diets and health problems

In many cases, the health impact of a proper or improper diet may only be noticed when one is aware of subjective symptoms and the illness is advanced. Where infants are concerned, a mother may experience a low milk supply or become unable to breastfeed a child at all due to poor nutrition or health, or child neglect. In their early childhood and school-age years, children may experience an imbalance in energy and nutrition intake that is necessary for them due to picky eating, unbalanced eating, or allergy.

According to an FIDR report¹³, the prevalence of **stunting** in Cambodia was approximately 20% among children of age 6 years, peaked at over 40% in those of age 10–12 years, and was still higher than 30% in 13–15 years. **Wasting** accounted for 10% in age group 7–9 years and approximately 20% in 10–15 years. As for **malnutrition**, the prevalence increased significantly at the age of 10–12 years. In a comparison of children’s nutrition status between urban and rural areas, malnutrition was severe among rural children (Table 6.4). See Chapter 9 to learn about the definitions of stunting, wasting, and underweight as indicators of malnutrition.

For normal growth of children, intake of protein as well as energy is important. In Cambodia, the largest source of students’ protein intake was cereal, followed by fish, meat, eggs, and legumes (Figure 6.10)¹³. The most common meal pattern in Cambodia was “rice with soup or sweetened soup,” followed by “rice with soup and deep-fried/grilled dish.” To ensure normal growth of children, it is important to improve nutrition status through a smart approach to supplying good-quality protein. Meat and eggs, for instance, contain iron on top of quality proteins, which helps prevent anemia. In Cambodia, people consume more soy milk than regular milk, and soy milk serves as their source of protein intake. Proteins, which are an important composition of a human body, are building blocks of the immune system,

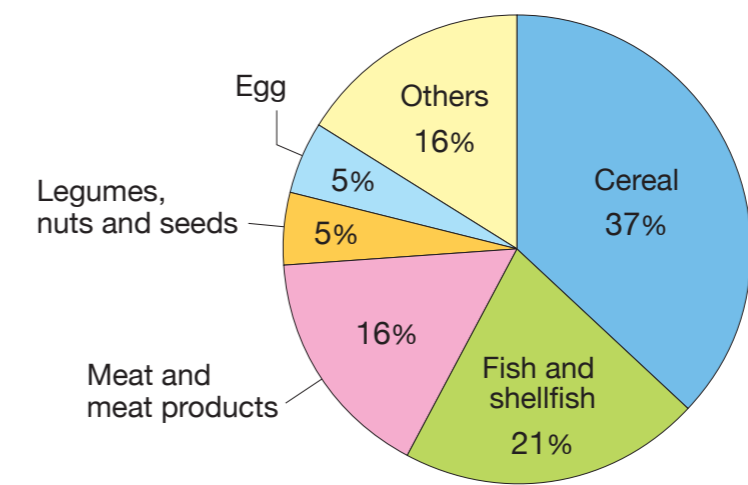
enzymes, and hormones.

Overweight and obesity, meanwhile, were observed in 3.2% of students. Prevalence of overweight was 2.1% among urban students¹³. Among students, 86.6% consumed junk food at least once a week and 21.9%, every day; 84.3% consumed soft drinks at least once a week and 11.8%, every day. One of the **Seven Key Messages** advises against excessive intake of salt or fat, and this helps prevent non-communicable diseases from developing. While child overweight and obesity are not an issue of high priority in Cambodia at present, it will become important to educate students on what diets help prevent non-communicable diseases.

Table 6.4 Comparison of nutrition statuses (age 6–17 years)

	Urban	Rural
Stunting	20.4%	36.4%
Wasting	10.4%	16.1%
Underweight	22.1%	38.1%

Source: FIDR, 2017¹³



Source: FIDR¹³

Figure 6.10 Sources of protein for children

Column: Dietary habits that prevent lifestyle diseases will also help prevent infectious diseases

Dietary guidelines implemented in Cambodia including the Cambodian Food Pyramid not only help prevent lifestyle diseases but infectious diseases as well. WHO has published “Nutrition advice for adults during #COVID-19¹⁴” (Table 6.5), emphasizing the importance of food: “Proper nutrition is vital. Eat a well-balanced diet every day to get the vitamins, minerals, dietary fiber, protein and antioxidants your body needs to be healthier with a stronger immune system and to lower your risk of chronic illnesses and infectious diseases.”

Table 6.5 Nutrition advice for adults during the COVID-19 outbreak¹⁴

Eat fresh and unprocessed food such as dark green leafy vegetables, orange/yellow colored fruit and vegetables, legumes (e.g., lentils, beans), nuts and whole grains (e.g., unprocessed maize, millet, oats, wheat, brown rice or starchy tubers or roots such as potatoes), and proteins (e.g., meat, fish, eggs, milk).

Drink 8-10 cups of water every day. Water is the best choice, but you can also consume other drinks (e.g., lemon juice diluted in water and unsweetened, tea and coffee – not too much), and eat fruits and vegetables that contain water (e.g., cucumber, tomatoes, spinach, mushroom, melon, broccoli, Brussels sprouts, oranges, apples, blueberries).

Eat healthy fats found in white meat (e.g., poultry), fish, avocado, nuts, olive oil, soy, canola, sunflower and corn oils, rather than fats found in fatty meat, butter, coconut oil, cream, cheese, ghee and lard. Avoid fats found in processed food, processed meats, fast food, snack food, fried food, frozen pizza, pies, cookies, margarines and spreads.

Limit your salt intake. When cooking and preparing food, limit the amount of salt and high sodium condiments (e.g., soy sauce, fish sauce). Limit your daily salt intake to less than 5 g (approximately 1 teaspoon), and use iodized salt. Avoid snack foods that are high in salt.

Limit your sugar intake. Choose fresh fruits instead of sweet snacks (e.g., cookies, cakes, chocolate). Limit your intake of soft drinks or sodas, still drinks and other drinks that are high in sugar (e.g., sweetened fruit juices, fruit juice concentrates and syrups, flavored milks, yogurt drinks).

Avoid eating out. Eating out during this COVID-19 pandemic increases your contact with other people and your chance of being exposed to the virus. So eat at home. Home-cooked food is the best choice, and is healthier and more nutritious for you than calorie-filled food from outside the home.

Reach out for help. During this COVID-19 pandemic, you may need support with your mental health and diet to ensure you keep in good health, especially if you are living with a chronic illness and have suspected or confirmed COVID-19. If you feel overwhelmed, seek help from trained professionals and through other trusted sources (e.g., digital, social, print and broadcast).

Exercises for further thought and research

- [6-1] Review and assess your own lifestyle habits.
- [6-2] Discuss issues of lifestyle habits with your group members, and offer advice to one another.
- [6-3] Examine lifestyle habits of people who are obese. What makes them different from those of people who are not obese? Do they wish to change their lifestyle habits and overcome obesity? Or are

they content to remain as they are? And what are their reasons? Explore answers to these questions.

- [6-4] Examine dietary habits of people who are very thin. Explore the reasons behind them and discuss what may be done to improve them.
- [6-5] Cases of eating disorders are on the rise among young women in Western countries as well as some Asian countries, including Japan and South Korea. Discuss if there are women who suffer from anorexia or bulimia in Cambodia.
- [6-6] Identify health problems among children and young people around you that are likely to be a result of an improper diet, and discuss as many factors as possible that may explain why they eat as they do.
- [6-7] Discuss what health impacts there may be when the body fails to maintain homeostasis.

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