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# Healthy Eating to Manage Your Blood Pressure

## What is High Blood Pressure (BP)?

Blood pressure refers to the pressure of blood against the walls of blood vessels, and this pressure will vary as the heart contracts and expands.

"Systolic Blood Pressure (SBP)": When the heart contracts and pumps blood into blood vessels, the pressure on the blood vessels will be greater and the blood pressure figures will be higher.

"Diastolic Blood Pressure (DBP)": When the heart relaxes, the pressure on the blood vessels will be smaller and the blood pressure figure will be lower.

Normal blood pressure is essential to let blood flow around the body and deliver oxygen and nutrients to all tissues. Daily blood pressure will vary with different factors, including diet, posture, physical activity, mood and sleep. However, when blood pressure is constantly elevated, this is called hypertension (High blood pressure).

### Definition of Hypertension<sup>1</sup>

| Definition           | Systolic Blood Pressure SBP (mmHg) |     | Diastolic Blood Pressure DBP (mmHg) |
|----------------------|------------------------------------|-----|-------------------------------------|
| Ideal BP             | <120                               | and | <80                                 |
| Elevated BP          | 120 to 129                         | and | <80                                 |
| Stage 1 Hypertension | 130 to 139                         | or  | 80 to 89                            |
| Stage 2 Hypertension | ≥140                               | or  | ≥90                                 |

- Blood pressure is measured in millimetres of mercury (mmHg)
- Reference above is for adults above 18 years of age, who are not taking blood pressure medicine and do not have other serious medical problems

## Consequence of Hypertension

Chronic hypertension can increase burden to heart and damage blood vessels and organs, which may lead to stroke, heart disease, kidney failure, renal disease and blindness. The World Health Organization has recognised hypertension as one of the major risk factors for cardiovascular diseases.

According to the Department of Health, about 30% of adults in Hong Kong have hypertension. The prevalence rate increases with age to 65% for those over 65 years old<sup>2</sup>.

## Causes of Hypertension

Hypertension could be asymptomatic. Essential hypertension (also called idiopathic hypertension) is a form of hypertension that by definition has no identifiable cause, and could be induced by lifestyle or genetic factors. The causes of "Secondary Hypertension" include a variety of kidney diseases and endocrine dysfunction.

### Risk Factors of Hypertension

- Obesity
- High salt diet
- Excessive alcohol intake
- Lack of exercise
- Smoking
- Life stress
- Family history of hypertension
- With endocrine disorder, e.g. kidney disease
- Aging

## Prevention and Management of Hypertension

According to the Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults issued by the American College of Cardiology and the American Heart Association in 2017, the following non-pharmacological treatments have been clinically proven to be effective in preventing and treating hypertension:

### Proven Lifestyle Modification to Prevent and Treat Hypertension<sup>1</sup>

| Lifestyle Modifications             | Recommendations  | Approximate Impact on SBP (mmHg) |                |
|-------------------------------------|--|----------------------------------|----------------|
|                                     |  | Hypertension                     | Normal Tension |
| <b>Weight Loss</b>                  | <ul style="list-style-type: none"> <li>The goal is to maintain an ideal body weight (BMI 18.5 to 22.9kg/m<sup>2</sup>)</li> <li>Expect about 1 mmHg for every 1kg reduction in body weight</li> </ul>                | ↓ 5                              | ↓ 2 to 3       |
| <b>DASH Dietary Pattern</b>         | <ul style="list-style-type: none"> <li>Consume a diet which is rich in fruits, vegetables, whole grains, low-fat dairy products, dried beans and nuts</li> <li>Reduced content of saturated and total fat</li> </ul> | ↓ 11                             | ↓ 3            |
| <b>Dietary Sodium</b>               | <ul style="list-style-type: none"> <li>Optimal goal is to consume &lt;1,500mg/d, but aims for at least a 1,000mg/d reduction in most adults</li> </ul>   | ↓ 5 to 6                         | ↓ 2 to 3       |
| <b>Dietary Potassium</b>            | <ul style="list-style-type: none"> <li>Aims for 3,500 to 5,000mg/d, preferably by consumption of a diet which is rich in potassium</li> </ul>  | ↓ 4 to 5                         | ↓ 2            |
| <b>Physical Activity</b>            | <ul style="list-style-type: none"> <li>90 to 150 minutes of aerobic exercise per week</li> </ul>   | ↓ 5 to 8                         | ↓ 2 to 4       |
| <b>Moderation in Alcohol Intake</b> | For individuals who drink alcohol, reduce alcohol* to: <ul style="list-style-type: none"> <li>Men: ≤2 drinks daily</li> <li>Women: ≤1 drink daily</li> </ul>   | ↓ 4                              | ↓ 3            |

\* One serving of alcohol is equivalent to 330ml of beer, 150ml of red or white wine or 30ml of spirits

## Dietary Management

### Limit sodium/salt consumption to less than 2300mg per day (1 teaspoon of salt)

Sodium is a mineral commonly found in daily diets, and the most common sodium-containing food is salt (sodium chloride, NaCl). Eating too much sodium will cause water retention and induce hypertension. The human body only needs about 500mg of sodium ( $\frac{1}{4}$  teaspoon of salt) per day, but the Center for Food Safety in 2014 reported that the average daily intake was more than two teaspoons of salt, which was twice of the WHO recommendation. The National Heart, Lung, and Blood Institute (NHLBI) and the American Heart Association<sup>3</sup> recommends that adults with hypertension should limit to 2,300mg of sodium consumption per day, or ideally less than 1,500mg per day.

Natural foods such as milk, fish, vegetables, and water contain limited amount of sodium. The main source is from eating out or processed food. One gram of table salt contains about 0.4grams (400mg) of sodium, while a teaspoon of salt contains up to 2,300mg of sodium. Different seasonings such as soy sauce, oyster sauce, seafood sauce, tomato sauce, etc. also contain a lot of sodium. Since sodium can be used as a food preservative, many packaged foods or preserved and processed/canned foods are added with a substantial amount of sodium in order to extend the shelf life. It should be noted that the sodium content may not be determined by taste. Bland foods such as bread, biscuits and cereals may also contain food additives, e.g. sodium carbonate as an anti-caking agent, acidity regulator or bulking agent. Therefore, it is important to read food labels carefully to avoid high sodium intake.

### 1. Reduce Sodium Intake (Salt)

- Replace salt with herbs, spices, garlic, pepper, Sichuan pepper, anise or other salt-free seasoning
- Beware of hidden salt/sodium. Bouillon cubes, chicken powder, meat tenderisers, marinades, soy sauce and steak sauces
- Taste your food before adding salt and use the salt shaker sparingly

- Try more low-salt/sodium foods. Eating more fruits and vegetables not only reduces sodium, but also benefits with extra health benefits
- Keep it fresh! Choose fresh or frozen vegetable (without sauces) more often. Canned vegetables are typically higher in salt and sodium. Look for canned foods with no salt added
- Before eating canned food, drain and rinse with water to reduce salt/sodium content
- Try to avoid eating preserved foods, ready-to-eat foods and reducing eating out
- Try unsalted snacks, such as unsalted nuts and seeds

### 2. Avoid High Salted Food

|                                  |   |
|----------------------------------|---|
| <b>Preserved Food</b>            | <ul style="list-style-type: none"><li>• All kinds of preserved/pickled vegetables</li><li>• Salted and preserved eggs</li><li>• Preserved fish</li><li>• Dried fruit: salty lemon, salty citrus, plum, orange peel</li></ul>  |
| <b>Processed/Convenient Food</b> | <ul style="list-style-type: none"><li>• Bacon, sausage, ham, deli, cured meat, brine food, dried meat, meat floss, etc.</li><li>• Dried fish and dried scallops</li><li>• Cheese</li><li>• Canned food: luncheon meat, sardines etc.</li><li>• Instant noodles, instant microwavable food, snacks, etc.</li><li>• Salted nuts, salted biscuits, cheese rings, potato chips, shrimp strips, ready-to-eat laver, etc.</li></ul> |
| <b>Drinks and Others</b>         | <ul style="list-style-type: none"><li>• Spaghetti sauce and salad dressing</li><li>• Canned soup, packaged soup</li><li>• Chicken essence, bouillon, sauces</li><li>• Sports and energy drinks</li></ul>  |

### 3. Limited Usage of Seasonings

It is recommended to use "salty seasoning" no more than \_\_\_\_\_ servings per day (should be limited to about 4 to 6 servings per day)

The following foods contains an equivalent of 1 serving of salty seasoning (about 250mg of sodium):

| Serving Size (teaspoon) | Seasonings  |
|-------------------------|---|
| 1/8                     | Salt  |
| 1/2                     | Light/dark soy sauces, fish sauces, chicken powder          |
| 3/4                     | Japanese soy sauce, soy bean paste, Chu Hou sauce           |
| 1 1/4                   | Black bean sauce, fermented bean curd sauces, oyster sauces |
| 2 1/4 to 2 1/2          | Sweet soy bean sauces, satay sauce                          |
| 2 3/4                   | Ketchup   |
| 5 to 6                  | Worcestershire sauce, tomato paste                          |

Please consult a doctor or dietitian before using salt substitute

### 4. Eating Out Principles

- Restaurants usually use high-sodium seasonings such as monosodium glutamate (MSG), chicken powder, soy sauce, etc. Choose dishes that are steamed or boiled, avoid high-sodium cuisine cooked with heavy seasonings, preserved or processed ingredients
- Skip the sauce on your entree, or request it being served on the side, e.g. skip oyster sauce or fermented bean curd sauce for boiled vegetable, separate soy sauce from steamed rice roll
- Avoid fast foods such as hamburgers, french fries, fried chicken, pizza, etc.
- Avoid mixing rice with sauces and adding seasonings, such as table salt, ketchup or soy sauce
- If you need to restrict water and sodium, you should avoid drinking soup

### 5. Read Food Label

It is recommended to refer to the sodium content on the nutrition label before consumption, choose food with less sodium and avoid high sodium foods containing more than 600mg per 100g.

| Nutrition Claim           | Sodium Content |             |
|---------------------------|----------------|-------------|
|                           | Per serving    | Per 100g/ml |
| Sodium-free/<br>Salt-free | <5mg           | ≤5mg        |
| Very Low Sodium           | <35mg          | ≤40mg       |
| Low Sodium                | <140mg         | ≤120mg      |

The sodium content of the same type of product (e.g. biscuits) can also vary greatly. It is recommended to compare the level of sodium in the same unit (per 100g or 100ml) so as to select products with less sodium.

### 6. DASH Diet<sup>4</sup>

In recent years, the highly recommended Dietary Approaches to Stop Hypertension (DASH diet) demonstrates a beneficial relationship between eating patterns and blood pressure. Besides restricting sodium intake, a low-fat diet containing adequate potassium, calcium, magnesium and fibre can also effectively lower blood pressure. (If you have kidney disease, diabetes or other diseases, please consult a doctor or dietitian first.)

#### Principles of DASH Diet

- Reduce high-sugar and high-sodium foods
- Eat more fruits and vegetables to increase potassium and magnesium intake
- Eat unrefined whole grain foods
- Choose low-fat or skimmed milk products to increase calcium intake
- Eat moderate amounts of foods with protein, including meat, fish, poultry, seafood and eggs. Foods should be combined with beans and nuts to increase magnesium and calcium intake
- Control fat intake, especially foods with high saturated fat and high cholesterol

## DASH Eating Plan (Provides 1,600 to 2,000kcal per day)<sup>4</sup>

| Food Group                                 | Key Nutrients                        | Daily Serving            | Serving Size  |
|--|--------------------------------------|--------------------------|---|
| <b>Grains</b>                              | Energy, fibre and magnesium          | 6 to 8                   | ½ cup cooked rice, pasta, noodle or cereal<br>1 slice bread<br>1oz dry cereal   |
| <b>Vegetables</b>                          | Potassium, magnesium, and fibre      | 4 to 5                   | ½ cup cooked vegetable<br>1 cup raw leafy vegetable   |
| <b>Fruits</b>                              | Potassium, magnesium, and fibre      | 4 to 5                   | 1 medium fruit<br>¼ cup dried fruit (unsweetened)<br>½ cup fresh, frozen or canned fruit<br>½ cup fruit juice   |
| <b>Low-fat dairy</b>                       | Calcium and protein                  | 2 to 3                   | 1 cup milk/yogurt<br>1½oz cheese  |
| <b>Lean Meats, Fish, Poultry, and Eggs</b> | Energy, protein and magnesium        | 3 to 6                   | 1oz cooked meats, fish, or poultry (30g)<br>1 egg   |
| <b>Fats and Oils</b>                       | Energy and vitamin E                 | 2 to 3                   | 1 teaspoon vegetable oil (e.g. olive oil, canola oil, peanut oil)<br>1 teaspoon soft margarine<br>1 tablespoon mayonnaise<br>2 tablespoons low fat salad dressing |
| <b>Nuts, Seeds, and Legumes</b>            | Energy, magnesium, protein and fibre | 3 to 5 servings per week | 1 block tofu<br>½ cup cooked legumes (dry beans and peas)<br>⅓ cup or 1½oz nuts (unsalted)<br>2 tablespoons or ½oz seeds  |
| <b>Sweets and Added Sugars</b>             | Sweets should be low in fat          | <5 servings per week     | 1 tablespoon sugar<br>1 tablespoon jelly or jam   |

### References:

1. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: Executive Summary: A Report of the American College of Cardiology/ American Heart Association Task Force on Clinical Practice Guidelines. Hypertension. June 2018, 71 (6): 1269–1324
2. <https://www.chp.gov.hk/en/healthtopics/content/25/35390.html>
3. <https://www.heart.org/en/health-topics/high-blood-pressure/changes-you-can-make-to-manage-high-blood-pressure/shaking-the-salt-habit-to-lower-high-blood-pressure>
4. National Institutes of Health, National Heart, Lung and Blood Institute, "The Dash Diet" [www.nhlbi.nih.gov/DASH](http://www.nhlbi.nih.gov/DASH).