Medical Nutrition Therapy (MNT)







Guidelines for **Hypertension**

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Medical Nutrition Therapy Guidelines for Hypertension (second edition) Working Group



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LIST OF ABBREVIATIONS

AHA/ACC: American Heart Association/ American College of Cardiology

AND: Academy of Nutrition and Dietetics

BMI: Body mass index

BP: Blood pressure

CHD: Coronary heart disease

CKD: Chronic kidney disease

CPG: Clinical Practice Guidelines

CVD: Cardiovascular disease

DASH: Dietary Approaches to Stop Hypertension

DBP: Diastolic blood pressure

DRI: Dietary reference intake

ESC/ ESH: European Society of Cardiology/ European Society of Hypertension

HKRF: Hong Kong Reference Framework

HPT: Hypertension

MNT: Medical Nutrition Therapy

NHFA: National Heart Foundation of Australia

NHMS: National Health and Morbidity Survey

PEN: Practice based Evidence Nutrition

RACGP: Royal Australian College of General Practitioners

RCT: Randomised control trials

SBP: Systolic blood pressure

WC: Waist circumference

Chapter 1: INTRODUCTION

This is an updated and revised Medical Nutrition Therapy (MNT) guideline for adult patients with hypertension. This guideline supersedes the previous MNT published in 2005 and incorporates the best available evidence up to 2024.

Hypertension is described as a persistent raise of systolic blood pressure (BP) of 140mmHg or greater and/or diastolic BP of 90mmHg or greater, measured at least twice on two separate episodes [1]. The classification of hypertension is as described in Appendix A.

It is estimated 1.13 billion people have hypertension of which 1 in 5 are women and 1 in 4 are men [2]. The National Health and Morbidity Survey (NHMS) 2019 reported 16.9% known hypertension among adults, raised blood pressure among unknown hypertension was 14.1%, with overall prevalence of 30% [3].

1.1 STATEMENT OF INTENT

This guideline is intended to guide dietitians involved in providing medical nutrition therapy to adult patients with hypertension. The development of this guideline is based on the best available current evidence up to 2024, together with relevant recommendations, expert opinion, and clinical practice considerations. Adherence to this guideline alone may not necessarily guarantee the best outcome in every case. Individual patient presentations, precise nutrition diagnosis and clinical judgment are the paramount aspects in clinical practice decisions and management.

1.2 OBJECTIVES

The aim of this guideline is to provide evidence-based recommendations to assist dietitians in providing Medical Nutrition Therapy to adult patients with hypertension.

1.3 CLINICAL QUESTIONS

The clinical questions were developed and divided into subtitles and members of the working group were assigned topics within these subtitles.

The clinical questions of this guideline were:

a. What are the lifestyle measures that can improve blood pressure?
b. How effective is medical nutrition therapy (MNT) in achieving ideal blood pressure?
c. What is the dietary recommendation in management of hypertension for the following:
    I. Sodium
    II. Potassium
    III. Calcium
    IV. Magnesium
d. What are the strategies to implement the DASH diet?
e. What is the dietary recommendation for overweight and obese individuals?

f. How much and what type of physical activity to be recommended?
g. What are the practical strategies to reduce sodium intake?

1.4 TARGET POPULATION

The recommendations in this guideline are applicable to adult patients with hypertension.

1.5 TARGET GROUP

This guideline is designed mainly for dietitians who are involved in provision of nutrition therapy to adult patients with hypertension and those at risk of developing hypertension. Other healthcare professionals including doctors, nurses and pharmacists may use this guideline as reference.

1.6 LEVELS OF EVIDENCE AND GRADE OF RECOMMENDATION

The recommendations in this guideline were mainly adapted from international guidelines on nutrition therapy for patients with hypertension namely ACC/AHA 2018 [4], ESC/ ESH 2018 [5], PEN 2018 [6], Canada hypertension guidelines 2021 [7], HKRF for hypertension 2018 [8], AND 2017 [9], NHF Australia hypertension guidelines 2017 [10], Japanese hypertension guidelines 2019 [11], Taiwan hypertension guidelines 2022 [12], Malaysian CPG for Hypertension 2018 [1], and Singapore CPG for Hypertension 2017 [13]. When there are clinical questions not answered by these guidelines, additional literature search through electronic databases such as PubMed, Cochrane, Science Direct, and Google Scholar was performed to identify relevant articles. The literature search of this guideline was updated until 31st December 2024. Evidence in the guidelines and literature were discussed, tabulated in the evidence table and suitable statements and recommendations were formulated.

Consensus from the working group was used in the areas of inconclusive or insufficient evidence. In addition to the evidence-based practices, other factors such as cultural practices, individual patient conditions, preferences, availability of resources and cost were critically appraised in the process of decision-making.

The Evidence Grading System used is shown in Table 1 and 2. The level of evidence is based on the study design and the grade or recommendation of A, B or C is given based on the level of evidence. Grading will not be put forward if there is insufficient or inconclusive evidence.

Table 1: Levels of evidence

Level	Type of Evidence
1a	Evidence from meta-analysis of randomized controlled trials
1b	Evidence from at least one randomized controlled trial
IIa	Evidence from at least on well-designed controlled study without randomization
IIb	Evidence from at least one other type of quasi-experimental/cohort study
III	Evidence from well-designed non-experimental descriptive studies such as comparative studies, correlation studies and case control studies
IV	Evidence from expert committee reports or opinions and/or clinical experiences of respected authorities

Source: U.S. Preventive Services Task Force 2012; Canadian Task Force on Preventive Health Care 2011

Table 2: Grades of recommendation

Level	Type of Evidence	Action Words
Grade A Level 1a, 1b	At least one meta-analysis, systematic review, or randomized controlled trial, or evidence rated as good and directly applicable to the target population.	Recommended
Grade B Level IIa, IIb and III	Evidence from well-conducted clinical trials, directly applicable to the target population, and demonstrating overall consistency of results; or evidence extrapolated from meta-analysis, systematic review, or non-randomized controlled trial.	Encouraged
Grade C Level IV	Evidence from expert committee reports or opinions and/or clinical experiences of respected authorities; indicates absence of directly applicable clinical studies of good quality.	Should be considered

Source: Modified from Scottish Intercollegiate Guidelines Network (SIGN) 2001

Chapter 2: NUTRITION CARE PROCESS

The nutrition care process should be implemented for all individuals with hypertension whom referred to dietitian. Figure 1 shows the flow and each components of nutrition care process [14].

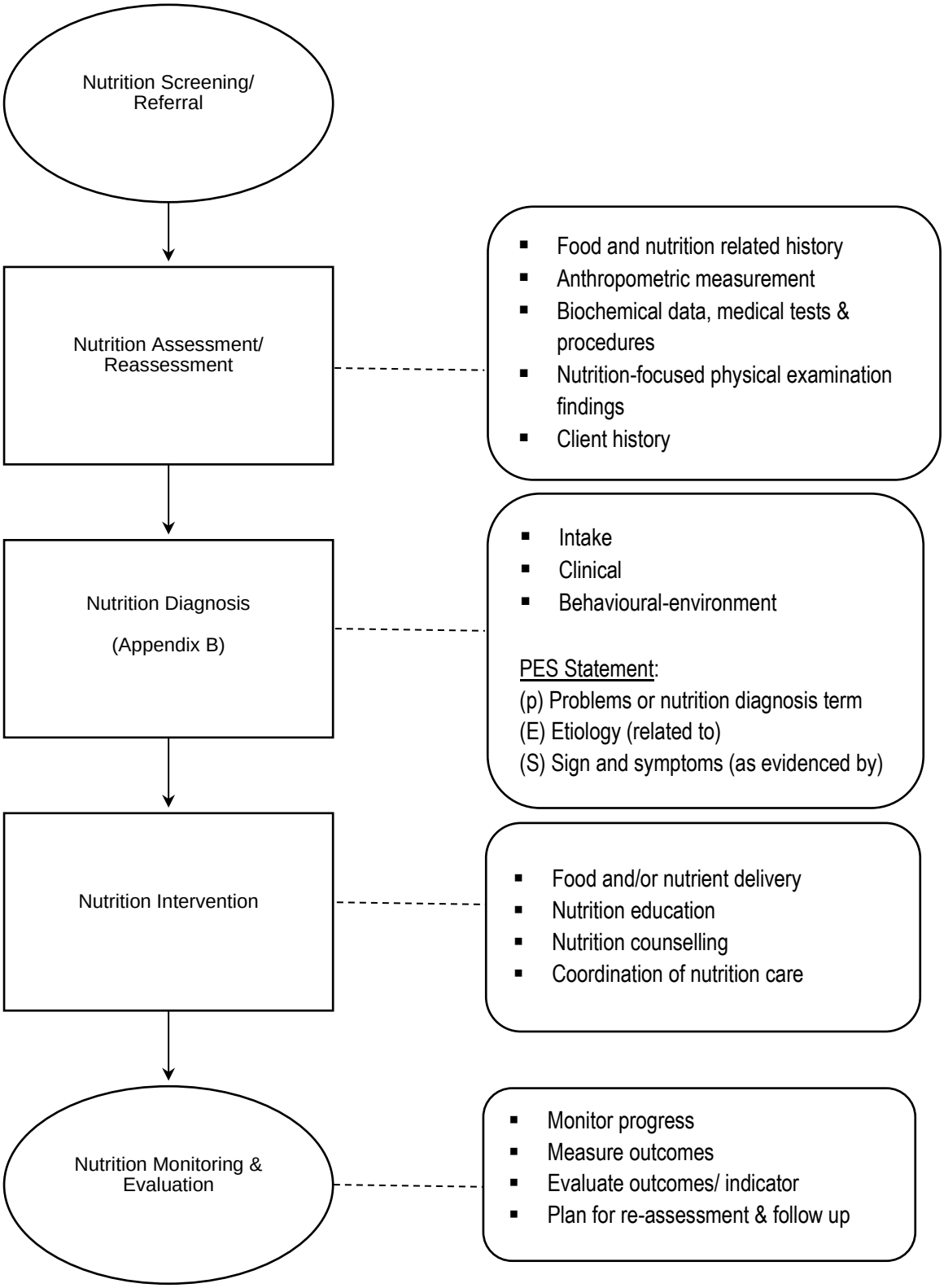


Figure 1: Nutrition Care Process.

Chapter 3: NUTRITIONAL ASSESSMENT

Nutritional assessment should be carried out for all individuals with hypertension whom referred to dietitian. Table1 shows the example nutritional assessment for each component [6].

Component	Assessments
Food and nutrition related history	▪ Food and nutrient intake: focusing on sodium, fruits and vegetables intake, alcohol consumption, high sodium food checklist ▪ Type of medications ▪ Complementary/ alternative medicine/ supplement use ▪ Knowledge/beliefs: Motivation, readiness to change ▪ Food and supplies availability: grocery, dining out, online food delivery and food preparations/cooking methods ▪ Behaviors: avoidance, restriction of certain foods, skipping meals ▪ Social/family support ▪ Physical activity: determine level of physical activity and exercise habits (duration, frequency, intensity) ▪ Nutrition quality of life (patients' perception of the nutrition intervention and its impact on their lives)
Anthropometric measurement	▪ Height ▪ Weight ▪ Body mass index (BMI) ▪ Waist circumference ▪ Weight history
Biochemical data, medical tests & procedures	▪ Fasting Serum Lipid Profile (TC, LDL-C, HDL-C, TG) ▪ Fasting glucose level, HbA1c ▪ Renal profile
Nutrition-focused physical examination findings	▪ Physical appearance ▪ Evidence of fluid retention (i.e., edema or ascites) ▪ Vital signs: blood pressure, pulse rate, heart rate (ECG)
Client history	▪ Personal & social history (current stress level and history of recent crisis) ▪ Medical & family history ▪ Past surgical history/ treatments
Comparative standards	▪ Estimated needs and method for estimating (predictive formula) ▪ Weight recommendations
Follow up	Two or more follow-up visits should be planned within six to eight weeks. Recommended to arrange the follow up on the same day as the doctor for better compliance.

Sources: PEN 2019; Carson et al. 2014 [6,15]

Chapter 4: NUTRITIONAL INTERVENTIONS

A nutrition intervention is a purposely planned action(s) designed with the intent of changing a nutrition-related behaviour, risk factor, environmental condition, or aspect of health status to resolve or improve the identified nutrition diagnosis(es) or nutrition problem(s) [16]. Nutrition interventions are selected and tailored to the client needs by planning and implementing appropriate interventions [16].

4.1 Nutrient recommendations

4.1.1 Sodium

Recommendation

- To lower sodium intake to less than 2000mg or 5g of salt (1 level teaspoon) per day is recommended (Grade A)

Justifications:

- A meta-analysis (34 RCT, 3230 participants) reported that an average reduction in salt intake of 4.4 g/day (range 2.3 to 6.9 g/day) in people with hypertension resulted in mean reduction of −5.39 mm Hg (−6.62 to −4.15) for SBP and −2.82 mm Hg (−3.54 to −2.11) for DBP. In normotensive people, the figures were −2.42 mm Hg (−3.56 to −1.29) and −1.00 mm Hg (−1.85 to −0.15), respectively [17].
- A meta-analysis (42 RCT AND 14 Cohort studies, 3230 participants) showed a reduction in sodium intake (<2g/day) among adults significantly reduced SBP by 3.47 mm Hg (0.76 to 6.18) and DBP by 1.81 mm Hg (0.54 to 3.08) [18].
- A systematic review (167 RCT) reported that a low sodium intake (<1600mg/day) was associated with reduction in SBP of 5.48mmHg and DBP of 2.75 mmHg among Caucasian patients with hypertension and reduction in SBP of 10.21mmHg and DBP of 2.60 mmHg in Asian patients with hypertension, as compared to patients with high sodium intake [19].

4.1.2 Potassium, Magnesium and Calcium

Recommendation

- Increasing dietary potassium intake from food rich in potassium in patients with normal renal function and not at risk of hyperkalaemia is recommended. (Grade A)

- There is insufficient evidence to support the routine potassium, magnesium and calcium supplementation in hypertension management. (Grade C)

Justifications:

- A meta-analysis (33 trials, 2609 participants) reported an increase in potassium excretion of 50mmol/day was associated with an average SBP reduction of 4.4mm Hg in hypertensive and 1.8mm Hg in normotensive individuals [20].
- A systematic review (22 RCTs, 1606 participants) shown that increased potassium intake significantly reduced SBP by 5.32 mm Hg and DBP by 3.10 mm Hg in individuals with hypertension. However, in people with impaired urinary potassium excretion, increasing potassium intake is not advisable as it can increase the risk for hyperkalaemia [21].
- Since potassium is found in a wide variety of food such as fresh fruits and vegetables and legumes, increasing potassium intake through supplementation is not necessary [21].
- A systematic review (16 trials, 3048 participants) showed intake of calcium (through supplementation/food fortification) of less than 1000mg/day resulted in reduction in SBP of -0.08 mmHg whereas DBP -0.54 mmHg. Participants receiving calcium 1000-1500 mg, the effect on SBP was -1.14 mmHg whereas DBP -0.71 mmHg. Meanwhile, participants receiving calcium more than 1500 mg, the effect on SBP was -2.79 mmHg whereas DBP -1.43 mmHg [22].
- A meta-analysis (105 RCTs, 6805 participants, at least 8 weeks of follow-up) reported that there is no evidence that calcium and magnesium supplements had inconsistent effect on BP [23].
- A review of clinical guidelines concluded that recommendations for potassium-enriched salt substitutes are currently inconsistent. However, with the strong evidence from numerous trials demonstrates that switching to a potassium-enriched salt containing 75% sodium chloride and 25% potassium chloride is an effective strategy for lowering blood pressure and reducing cardiovascular events in patients with hypertension unless they have advanced kidney disease, are using a potassium supplement, are using a potassium-sparing diuretic, or have another contraindication [24].

4.1.3 Dietary Approaches to Stop Hypertension (DASH) diet

Recommendation

- For patients with HPT, adopting DASH diet is recommended. (Grade A)

Justifications:

- A systematic review & meta-analysis (20 RCT, 1917 participants, intervention duration: 2-24 weeks) reported that among adults with hypertension, the DASH diet resulted in significant decrease in SBP (-5.2 mmHg, 95% CI: -7.0 to -3.4) and DBP (-2.6mmHg, 95% CI: -3.5 to -1.7) as compared to usual diet controls [25].
- A meta-analysis (41 RCT, 8416 participants, median intervention duration: 12 weeks) demonstrated high-fiber (wholegrains and legumes) and high-fruit and vegetable intake was associated with lower SBP of -0.65mmHg (95% CI: -1.83 to 0.53) and -0.57mmHg (95% CI: -7.45 to 6.32), respectively. However, the effect of DASH diet on SBP was higher [-5.53mmHg (95% CI: -7.95 to -3.12)] as compared to high-fiber or high-fruit and vegetable diet [26].

- A meta-analysis (30 RCTs, 5545 participants, intervention duration: 2-52 weeks) showed that DASH diet had significantly reduced SBP by -3.2 mmHg (95% CI: -4.2 to -2.3) and DBP by -2.5 mmHg (95% CI: -3.5 to -1.5) as compared to usual diet controls in adults with and without HPT [27].
- A RCT study (144 participants, intervention duration: 4 months) demonstrated that in patients with HPT, DASH diet could reduce clinic-measured BP by 11.2/7.5 mmHg as compared to usual diet controls [28].
- A systematic review & meta-analysis (41 cohort Asian studies, 799 to 636 000 participants, intervention duration: 2.4 to 19.4 years) demonstrated that adherence to a high-quality dietary pattern is consistently associated with a lower risk of cardiovascular disease among populations in South, Southeast, and East Asia. This dietary pattern is defined by high intake of at least three or more of the following food groups: (a) fruits and vegetables, (b) whole grains, (c) healthy protein sources—including legumes and nuts, fish and seafood, low-fat dairy, and lean meat and poultry—and (d) liquid plant oils. The DASH eating pattern, which is based on broad food and nutrient categories, offers sufficient flexibility to incorporate culturally relevant, Asian-specific food sources, thereby supporting its applicability across diverse Asian contexts [29].
- A systematic review & meta-analysis (8 RCT, 38 to 237 participants, intervention duration: 1-4 months) found that the DASH diet led to significant reductions in SBP (1.29 to 4.6 mmHg; 95% CI: −2.17 to −0.41; p<0.005) and DBP (0.76 to 1.1 mmHg; 95% CI: −1.39 to −0.13; p<0.005) [30].
- Evidence is growing that a high-fiber diet (like DASH) positively modulates the gut microbiota, which contributes to its BP-lowering effects through mechanisms beyond traditional nutrition [31].
- Some recent studies reported that replacing animal protein (red meat and processed meats) with plant protein (tempeh, legumes, nuts) (like DASH diet) has been associated with lower BP and reduced mortality from CVD [32,33].

4.2 Lifestyle modifications

4.2.1 Weight Reduction

Recommendation

- Weight loss of 4-5kg is recommended to reduce SBP by 4 to 7 mmHg and DBP by 3 to 6 mmHg in adults with hypertension who are overweight or obese. (Grade A)
- Achieving and/ or maintaining healthy BMI (25kg/m^2) and waist circumference (90cm for men and 80cm for women) is recommended. (Grade A)

Justifications:

- A meta-analysis (25 randomized, controlled trials, 4874 participants) demonstrated a net weight reduction of −5.1 kg by means of energy restriction, increased physical activity, or both reduced systolic blood pressure by −4.44 mm Hg (95% CI, −5.93 to −2.95) and diastolic blood pressure by −3.57 mm Hg (95% CI, −4.88 to −2.25). Blood pressure reductions were −1.05 mm Hg (95% CI, −1.43 to −0.66) systolic and −0.92 mm Hg (95% CI, −1.28 to −0.55) diastolic when expressed per kilogram of weight loss [34].

- In the stratified meta-analysis, larger BP reductions were observed in populations with an average weight loss >5 kg than in populations with less weight loss, both for SBP (−6.24 mm Hg [95% CI, −8.06 to −4.41] vs −2.44 mm Hg [95% CI, −4.38 to −0.49]) and DBP (−4.97 mm Hg [95% CI, −6.62 to −3.31] vs −1.97 mm Hg [95% CI, −3.71 to −0.21]) [34].
- A 6-year follow-up cohort study among 3800 essential hypertensive participants reported that high waist circumference (WC) was associated with HPT and increased the risk of developing coronary artery disease (CAD) by 3-fold among patients with HPT [35].
- A population-based longitudinal study of China Health and Nutrition Survey (CHNS) from 1993 to 2015 reported that for every 10cm WC gain per year in men and women was shown associated with an increase of 0.98 mmHg and 0.97 mmHg in SBP and 1.13 mmHg and 0.74 mmHg in DBP, respectively, independent of changes in their BMI [36].

4.2.2 Exercise

Recommendation

- An increase in physical activity with moderate intensity aerobic exercise for at least 30 minutes, 5 times a week or accumulative of 150 minutes per week is recommended. (Grade A)

Justification:

- A meta-analysis (54 RCTs, 2419 participants) reported that aerobic exercise of at least 150 min per week reduced SBP by 5.1mmHg and DBP by 2.8mmHg. Besides, a dose-dependent pattern was observed between weekly exercise duration and BP reduction in this study, indicating that engaging in aerobic exercise over 150 minutes per week is more effective in BP lowering [37].
- A systemic review (20 RCTs, 1270 participants) that compared no intervention against a weekly schedule of three to five supervised sessions of aerobic exercise for 30-60 min, with at least 8 weeks duration in patients with hypertension, reported a reduction in SBP and DBP of 4.6mmHg and 2.4mmHg, respectively [38].
- A meta-analysis (44 RCTs, 2674 participants) with the training duration of at least 4 weeks, suggested aerobic exercise of 30-60 minutes per session, 3-5 times a week, at an intensity of approximately 40-50% of maximum exercise capacity as a suitable approach for lowering blood pressure [39].
- A systemic review (15 RCTs, 633 participants) showed that endurance training induced a significant reduction in daytime SBP and DBP by 3.2mmHg and 2.7mmHg, respectively [40].
- For patients with cardiac disease and practising sedentary lifestyle, it is advisable to commence with modest physical activity and gradually progress towards the recommended level, as sudden vigorous physical activity was linked to higher risk of cardiovascular events [10,41]
- Individuals with chronic health issues and require specialized care can be referred to a certified exercise physiologist or physiotherapist [10,42].

4.2.3 Smoking cessation

Recommendation

- Cessation of smoking (in any form) is encouraged. (Grade B)

Justification:

- A systematic review and meta-analysis (13 studies, 6 RCTs) with 6 to 160 adults (aged 23.0-53.5 years old) reported that smoking cessation decreased the arterial stiffness measured using pulse valve velocity (ES −0.52, 95% CI: −1.02 to −0.03, 3.5% m/s) compared to those maintaining this behaviour [43].
- A systematic review and meta-analysis (26 cohort studies) showed relative risk of heart failure was 1.75 (95% CI: 1.54–1.99, I^2 = 81%, n = 10) for current smokers, 1.16 (95% CI: 1.08–1.24, I^2 = 51%, n = 9) for former smokers, and 1.44 (1.34–1.55, I2 = 83%, n = 10) for ever smokers compared with never smokers. A 28% reduction in risk of heart failure was reported for those at 30 years of smoking cessation compared with current smokers [44].
- A standardized case-control study (27089 participants, 52 countries) reported that current smoking was associated with a greater risk of non-fatal acute myocardial infarction (AMI) (OR: 2.95, 95% CI 2.77–3.14, p<0.0001) compared with never smoking and the risk increased by 5.6% for every additional cigarette smoked. The risk associated with former smoking reduced within 3 years of quitting smoking (OR: 1.87; 95% CI: 1.55–2.24). A residual excess risk remained 20 or more years after quitting (OR: 1·22, 95% CI: 1·09–1·37) [45].

4.2.4 Alcohol

Recommendation

- People who drink should limit alcohol intake to 2 standard drinks per day for men and 1 standard drink per day for women. (Grade A)
- There is no benefit to initiate alcohol consumption for cardio-protection

Justifications:

- A meta-analysis (7 nonexperimental Cohort Studies) involved 19,548 participants with a median follow-up of 5.3 years found that average SBP was 1.25 mmHg; and 4.90 mmHg higher for 12 or 48 grams of daily alcohol consumption, compared with no consumption of alcohol [46].
- A systematic review (32 RCTs, 767 participants) reported that high-dose alcohol (>30g) increases SBP by 3.7 mmHg and DBP by 2.4 mmHg, more than 13 hours after consumption [47].
- A randomized controlled study (24 adults) found that daily consumption of ≈40g of alcohol, either red wine (375 ml, 39g alcohol), or beer (1125 ml, 41g alcohol) for 4 weeks resulted in increased awake SBP (2.9 and 1.9 mm Hg, respectively; *P*<0.05). The vasopressor effect of a daily intake of 4

standard drinks of beer and red wine resulted in respective increases of 1.7 mmHg and 2.2 mmHg in 24-hour SBP when compared with 4 weeks of abstinence [48].

- A systematic review and meta-analysis (36 trials with 2865 participants) showed that in people who drank more than two drinks per day, a reduction in alcohol intake was associated with increased blood pressure reduction. The reduction was strongest in people who drank six or more drinks per day if they reduced their intake by about 50%: systolic blood pressure −5·50 mm Hg and diastolic blood pressure −3·97 mmHg [49].
- A combined analysis of 83 prospective studies (599 912 individual data for current drinkers) showed that alcohol consumption was roughly linearly associated with a higher risk of stroke (HR per 100 g per week higher consumption 1·14, 95% CI, 1·10–1·17), coronary disease excluding myocardial infarction (1·06, 1·00–1·11), heart failure (1·09, 1·03–1·15), fatal hypertensive disease (1·24, 1·15–1·33); and fatal aortic aneurysm (1·15, 1·03–1·28) [50].

4.2.5 Caffeine – coffee and tea

Recommendation

- Regular consumption of green tea or black tea is recommended (Grade A)
- The relationship between coffee intake and blood pressure remains inconclusive.

Justifications:

- A systematic review and meta-analysis (5 RCTs, 408 individuals) showed that regular tea intake led to a significant reduction in SBP (weighted mean difference: -4.81 mmHg, 95%CI: -8.40 to -1.58, p=0.004) and DBP (weighted mean difference: -1.98 mmHg, 95%CI: -3.77 to -0.20, p=0.029). A longer duration of tea intake (≥3 months) was associated with greater decreases in both SBP and DBP [51].
- A meta-analysis (24 RCTs, 1697 participants, 3-16 weeks of intervention, 1-5½ cups) showed that green tea significantly lowered SBP (mean difference: 1.17 mmHg; 95% CI: 2.18 to 0.16 mmHg; p=0.02) and DBP (MD: 1.24 mmHg; 95% CI: 2.07 to 0.40 mmHg; p=0.004) as a pooled results [52]
- A systematic review and meta-analysis (12 RCTs, 378 participants, dose of 4-5 cups of black tea for 1–24 week) reported that the pooled mean effect of regular tea ingestion was -1.8 mmHg (95% CI: -2.8, -0.7; p=0.0013) for SBP and -1.3 mmHg (95% CI: -1.8, -0.8; p< 0.0001) for DBP. The meta-analysis concluded that regular consumption of black tea can reduce blood pressure, and although the effect is small, it could be important for cardiovascular health at the population level [53].
- A meta-analysis (16 RCTs, 1010 participant, and at least 7 days of intervention) showed that significant rise in SBP of 2.04 mmHg (95% CI: 1.10–2.99) and DBP of 0.73 mmHg (95% CI: 0.14–1.31) was found as pooled mean of coffee and caffeine trials. The BP elevations appeared to be larger for caffeine trials (median dose: 410mg/day) [SBP: 4.16 mmHg (2.13–6.20) and DBP: 2.41 mmHg (0.98–3.84)] as compared to coffee trials (median intake: 725ml/day) [SBP: 1.22 mmHg (0.52–1.92) and DBP: 0.49 mmHg (−0.06–1.04)] [54].

- A meta-analysis (10 RCTs and 5 cohort studies) demonstrated that coffee consumption resulted in a pooled weighted difference in SBP of −0.55 mmHg (95% CI: −2.46 to 1.36) and DBP −0.45 mmHg (95% CI −1.52 to 0.61). There wasn't any statistically significant effect of coffee consumption on BP or the risk of hypertension [55].

Chapter 5: MONITORING AND EVALUATION

To reassess signs and symptoms from problem-etiology-sign and symptom (PES) statements to determine if goal/prescription and interventions have been implemented. The suggested length of contact time is 30 - 45 minutes for first visit and 15 - 30 minutes for subsequent visit (s) [56].

Component	Assessments
At each visit, reassess	▪ Weight ▪ Dietary intake pertinent to nutrition diagnosis ▪ Comprehension of nutrition prescription ▪ Adherence to nutrition prescription ▪ Physical activity level ▪ Changes in medications and dietary supplements ▪ Stages of change ▪ Progress toward achievement of specified goals and any related barriers
As feasible, monitor monthly or quarterly	▪ Waist circumference ▪ Blood pressure readings ▪ Newly reported lab values

Sources: Carson et al. 2014 [15]

Appendix A: CLASSIFICATION OF HYPERTENSION

a) Isolated Systolic Hypertension

Isolated systolic hypertension (ISH) is defined as SBP of ≥140 mmHg and DBP <90 mmHg [1].

b) Isolated Office ("White-Coat") Hypertension

White coat hypertension is characterised by an elevation in clinic blood pressure but normal home or ambulatory blood-pressure values. In these subjects the clinic BP is ≥ 140 mmHg systolic and/ or ≥90 mmHg diastolic but the home or daytime (awake) ambulatory BP measurements are lower than 135/85 mmHg [1].

c) Masked Hypertension

Patients with masked hypertension have normal clinic blood pressure (<140/90 mmHg) but elevated daytime ambulatory or home blood-pressure level (≥135 mmHg systolic and/or ≥85 mmHg diastolic) [1].

Table 3: Classification of clinic blood pressure levels in adults

Classification	**Systolic (mmHg)**		**Diastolic (mmHg)**
Optimal	<120	and	<80
Normal	120-129	and/or	80-84
At risk	130-139	and/or	85-89
Hypertension			
Stage 1(mild)	140-159	and/or	90-99
Stage 2 (moderate)	160-179	and/or	100-109
Stage 3 (severe)	≥180	and/or	≥110
Isolated systolic hypertension (ISH)	≥140	and	<90

Source: Malaysian CPG 2018 [1]

Table 4: Criteria for staging hypertension based on clinic, home and ambulatory blood pressure monitoring

Category	Clinic BP (mmHg)	Home BP monitoring average or ambulatory BP daytime, Average (mmHg)
Stage I Hypertension	≥140/90	≥135/85
Stage II Hypertension	≥160/100	≥150/95
Severe Hypertension	SBP≥180 or DBP≥100	-

Source: Malaysian CPG 2018 [1]

Appendix B: NUTRITION DIAGNOSIS-PES STATEMENT

Table 5: Sample nutrition diagnostic statements for patients with hypertension:

Problem	Etiology	Sign and symptoms
	INTAKE	
Excessive energy intake	▪ Food and nutrition related knowledge deficit concerning energy intake ▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Lack of or limited access to healthful food choices ▪ Lack of motivation for behaviour change ▪ Failure to adjust for lifestyle changes (e.g., decrease in physical activity) or decreased metabolism (e.g., aging) ▪ Failure to adjust for restricted mobility due to recovery from injury or surgical procedure	▪ Self-reported estimated energy intake in excess of energy needs ▪ Intake of high caloric density or large portions of food/ beverages ▪ BMI > 25kg/m^2 or weight gain
Excessive sodium intake	▪ Food- and nutrition-related knowledge deficit concerning sodium intake ▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Lack of or limited access to healthful food choices ▪ Lack of motivation for behaviour change ▪ Failure to adjust for lifestyle changes (eg: new environment or frequently eating outside food, fast food and processed food) ▪ Impaired taste sensation	▪ Self-reported estimated sodium intake in excess of recommended sodium needs ▪ Frequent intake of processed food/eating outside/fast food ▪ High blood pressure readings ▪ Edema/weight gain
Excessive alcohol intake	▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Food and nutrition related knowledge deficit concerning appropriate alcohol intake ▪ Alcohol addiction ▪ Lack of motivation in reducing alcohol intake.	▪ History of estimated alcohol intake in excess of recommendation: a) Intake of >2 drinks/day (men) b) Intake of >1 drink/day (women) ▪ Binge drinking ▪ Hypertriglyceridemia ▪ Abnormal LFT readings

Excessive fat intake	▪ Food- and nutrition-related knowledge deficit concerning appropriate amount of dietary fat ▪ Unsupported beliefs/attitudes about food, nutrition, and nutrition-related topics ▪ Lack of or limited access to healthful food choices ▪ Lack of motivation for behavior change	▪ Self-reported estimated fat intake in excess of fat needs ▪ Frequent intake of high-fat foods ▪ Frequent food preparation with added fat ▪ High TC, LDL values
Inadequate fiber intake	▪ Food and nutrition related knowledge deficit concerning desirable quantities of fiber ▪ Lack of or limited access to fiber-containing foods/fluids ▪ Difficulty chewing or swallowing high-fiber foods ▪ Economic constraints that limit availability of higher fiber foods ▪ Lack of motivation for behavior change/ denial to increase fiber intake	▪ Estimated intake of fiber is insufficient as compared to recommendations by American Heart Association (38 g/day for men and 25 g/day for women) ▪ Self-reported estimated fiber intake (servings) fewer than the recommended fiber servings.
CLINICAL (NC)		
Overweight/Obesity/ Unintended weight gain	▪ Excessive energy intake ▪ Physical inactivity ▪ Food and nutrition related knowledge deficit concerning energy intake ▪ Failure to adjust for lifestyle changes (e.g., decrease in physical activity) or decreased metabolism (e.g., aging) ▪ Failure to adjust for restricted mobility due to recovery from injury or surgical procedure ▪ Increase in psychological and life stress	▪ BMI > 25kg/m^2 or weight gain ▪ Self-reported estimated energy intake in excess of energy needs ▪ Intake of high caloric density or large portions of food/ beverages ▪ Waist circumference higher for normative standard for age and sex. ▪ Longer duration of sedentary activities (e.g. screen time)
BEHAVIORAL-ENVIRONMENTAL (NB)		
Food and nutrition related knowledge deficit	▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Lack of or limited prior nutrition-related education ▪ Limited interest in learning/ applying information ▪ Uncertainty on how to apply nutrition information ▪ Prior exposure to incorrect information	▪ Verbalizes inaccurate or incomplete information ▪ No prior knowledge of need for food- and nutrition-related recommendations ▪ No prior education provided on how to apply food and nutrition related information ▪ Verbalizes unwillingness or disinterest in learning information ▪ New medical diagnosis

Not ready for diet/lifestyle change	▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Limited interest in learning/ applying information ▪ Limited social support for implementing changes ▪ Limited acceptance of need to change ▪ Limited self-efficacy for making change or demoralization from previous challenges associated with change	▪ Negative body language (e.g. frowning, limited eye contact, defensive posture, limited focus, fidgeting) ▪ Denial of need for food- and nutrition-related changes ▪ Inability to understand required changes ▪ Limited self-efficacy to make change or to overcome barriers to change ▪ Resistance to change
Limited adherence to nutrition related recommendations	▪ Unsupported beliefs/attitudes about food, nutrition and nutrition-related topics ▪ Limited interest in learning/ applying information ▪ Limited social support for implementing changes ▪ Limited value for behavior change ▪ Limited confidence in ability to change ▪ Perception that limited resources (eg, time, financial) prevent changes ▪ Food and nutrition-related knowledge deficit concerning how to make nutrition-related changes.	▪ Expected anthropometric outcomes (e.g. weight changes) are not achieved ▪ Negative body language (e.g. frowning, limited eye contact, defensive posture, limited focus, fidgeting) ▪ Limited ability to recall changes agreed upon ▪ Limited or inconsistent adherence with agreed nutrition plan ▪ Verbalizes frustration or barriers to change in applying food/nutrition information ▪
Undesirable food choices	▪ Lack of prior exposure to accurate nutrition-related information ▪ Cultural practices that affect the ability to learn/apply information ▪ Lack of or limited access to recommended foods ▪ Perception that lack of resources (eg, time, financial) prevent selection of food choices consistent with recommendations ▪ Lacks motivation and/or readiness to change ▪ Unwilling or disinterested in learning/applying information ▪ Psychological causes such as depression and disordered eating.	▪ High blood pressure readings ▪ High lipid level ▪ Estimated intake inconsistent with Malaysian Dietary Guidelines or Healthy Plate concept or nutrition prescription ▪ Inability to apply the guidelines, Healthy Plate concept or nutrition prescription ▪ Unwillingness or disinterest in selecting food consistent with the guidelines or recommendations

Physical Inactivity	▪ Injury, lifestyle changes, medical conditions leading to physical disability or limitations that reduces physical activity of daily living ▪ Food and nutrition related knowledge deficit concerning health benefits of physical activity ▪ Limited social support for implementing changes ▪ Limited or limited access to safe exercise environment and/or equipment ▪ Limited value for behavior change ▪ Time constraints	▪ Obesity: BMI > 30 or waist circumference of >90cm for men and >80cm for women ▪ Infrequent, low-duration and/or low-intensity physical activity (less than 30 minutes of exercise five days a week) ▪ Longer duration of sedentary activities (e.g. screen time)

Source: AND eNCPT 2020 [16].

Appendix C: NUTRITION EDUCATION IN PRACTICE

<table>
<tr><td>Eating out</td><td>

Do not finish off the gravy/ soup of a dish.
Do not add table salt/ soy sauce into your dishes.
Minimize use of condiments such as sambal belacan, budu, cencaluk.
Cut down processed foods (example: opt for mee hoon instead of instant noodles, order clear soup instead of cream soup).
Cut down fast foods (example: order single burger with less sauce instead of double cheese burger).
Request for less salt or sauce usage in the cooking.
The list of high sodium foods with the sodium content is as attached in Appendix D.

</td></tr>
<tr><td>Recipe modification</td><td>

Portion out separately for patient with HPT while cooking the dish for the whole family. Add natural seasoning such as pepper, chopped coriander, and lime to the separated portion.
When a recipe calls for high sauce usage, suggest reducing the sauce usage appropriately.
Use fresh food instead of canned foods in your cooking (example: opt for fresh fish instead canned fish).
Flavour the dishes with natural seasonings such as spices and herbs.
Consider UMAMI-rich foods that are not high in salt in in the selection of ingredients to enhance the flavour of a dish (Appendix E).

</td></tr>
<tr><td>Salt reduction/ substitute</td><td>

Make your own chicken stock instead of chicken stock cubes, anchovy cubes and etc.
Consider potassium-based salt substitutes for sodium reduction, but use them with caution in patients with renal impairment or those who require potassium restriction.
The sodium and potassium content of salts and salt substitutes is as attached in Appendix F.

</td></tr>
<tr><td>Food labelling</td><td>

Educate patient to look out for hidden sodium in the ingredient list on the food label. The hidden sodium is as described in Appendix G.
Educate patient to read food label on sodium content per serving.
Below is the guide to common claims on food labels and their definitions:

<table>
<tr><th>Claims on food label</th><th>Definitions</th></tr>
<tr><td>Salt/ sodium-free</td><td>Less than 5 mg of sodium per serving</td></tr>
<tr><td>Very low sodium</td><td>35 mg of sodium or less per serving</td></tr>
<tr><td>Low sodium</td><td>140 mg of sodium or less per serving</td></tr>
<tr><td>Reduced sodium</td><td>At least 25% less sodium than the regular product</td></tr>
<tr><td>Light in sodium or lightly salted</td><td>At least 50% less sodium than the regular product</td></tr>
<tr><td>No-salt-added or unsalted</td><td>No salt is added during processing</td></tr>
</table>
Source: FDA 2021 [57]
</td></tr>
</table>

Appendix D: HIGH SODIUM FOODS WITH THE SODIUM CONTENT

Food Items	Serving Size	Sodium Content (mg)
Seasonings and condiments:		
Stock cube	1 piece (12g)	2208
Table salt	1 teaspoon (5g)	1959
Belacan (shrimp paste)	1 piece (44g)	750
Monosodium Glutamate (MSG)	1 teaspoon (5g)	615
Salted fish	1 piece (25g)	433
Budu (fish sauce)	1 teaspoon (5g)	323
Dried shrimp	1 tablespoon (10g)	255
Soy sauce (light)	1 teaspoon (5g)	253
Cencaluk (fermented shrimp)	1 teaspoon (5g)	224
Soy sauce (dark)	1 teaspoon (5g)	203
Oyster sauce	1 teaspoon (5g)	195
Marmite spread	1 teaspoon (5g)	183
Taucu (Fermented soybean paste)	1 teaspoon (5g)	90
Chili sauce	1 teaspoon (5g)	67
Curry paste	1 teaspoon (5g)	65
Tomato sauce	1 teaspoon (5g)	49
Snacks:		
Salted nuts	1 handful (30g)	541
Fish cracker *(Keropok ikan)*	5 pieces (30g)	263
Papadum	1 piece (6g)	247
Cheese slice	1 piece (20g)	241
Potato chip	10 pieces (25g)	140
Snack noodle	1 packet (25g)	126
Cuttlefish snack	1 packet (40g)	125
Processed foods:		
Instant noodle	1 packet (85g)	1500
Coney dog, fast food	1 whole (115g)	984
Canned mushroom condensed soup	½ cup (124g)	864
Cheese burger, fast food	1 whole (124g)	864
Sausage	1 piece (45g)	669
Chicken porridge, fast food	1 small serving (300g)	600
Pizza, fast food	1 slice (93g)	445
Canned baked beans	½ cup (127g)	435
Canned luncheon meat	1 slice (47g)	390
Mashed potato, fast food	1 small cup (95g)	332
French fries, fast food	1 packet, medium (116g)	290
Fried chicken, fast food	1 drumstick (65g)	242
Canned sardine in tomato sauce	1 piece (50g)	169
Nugget	1 piece (20g)	130
Fish ball	1 piece (15g)	100

Sources: Energy and Nutrient Composition of Food, Singapore Health Promotion Board 2011; Malaysian Food Composition Database Programme, c/o Institute for Medical Research, Kuala Lumpur, 1997-2015

Appendix E: UMAMI TASTE AND UMAMI-RICH FOODS

- The use of natural ingredients rich in umami taste compounds has been shown to enhance both umami and salty taste characteristics, potentially leading to reduced sodium intake [58].
- Glutamate is the first component identified to provide umami taste [59,60].
- Inosinate and guanylate were found to be able to synergistically increase umami taste provided by glutamate [59,60]. Refer to Figure 2.
- In recent years, more than 100 of umami-enhancing peptides have been identified [59,61].
- The curing, ageing, heat treatment and fermenting of certain foods could increase the umami components in it [59,61].
- Monosodium glutamate (MSG) is a popular flavor enhancer that produces an umami taste. Several intervention studies demonstrated that MSG enhances umami taste and can compensate for reduced salt in foods, enabling sodium reductions of 23–33% while maintaining palatability in savoury dishes [62,63].
- Nevertheless, a clinical trial demonstrated that high oral doses of MSG can cause headaches and pericranial muscle tenderness in sensitive individuals [64]. Additionally, chronic high MSG consumption has been linked to obesity, insulin resistance, and hypertension in animal models, though evidence is not fully consistent [65,66]. Further high-quality human studies are needed to clarify long-term health effects, metabolism, and safe consumption thresholds.

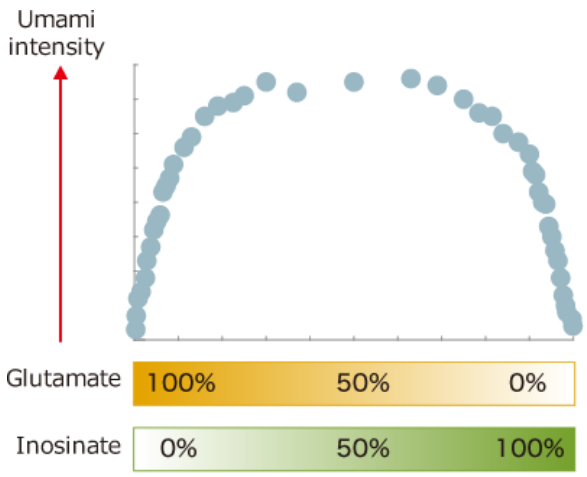


Figure 2: Relationship between the subjective Umami taste intensity and the concentration of Umami components. Adapted from Yamaguchi 1967 [67]

Consider UMAMI-rich foods in the selection of ingredients to enhance the flavour of a dish.

Example of UMAMI-rich foods:

Umami components	**Food sources**
Glutamate	Tomato, onion, seaweeds, broccoli, peas, asparagus, fish, seafood, egg yolks, and beets.
Inosinate	Chicken, pork, beef, sardine, and tuna
Guanylate	Certain dried mushrooms (e.g. shitake, morels)

Sources: Hartley et al. 2019 [59]; Umami Information Center 2021 [68].

Appendix F: CONTENT FOR POTASSIUM-BASED SALT SUBSTITUTES AND NORMAL SALT

Sodium and potassium contents of different types of salt:

Types of salt	Sodium (mg/5g)	Potassium (mg/5g)
Table Salt	1794	2.2
Bamboo Salt	1753	20.0
Himalayan Pink Salt	1740	12.3
Kosher Salt	1731	9.1
French Sea Salt	1562	14.2

Source: Tan et al. [69]

Sodium and potassium contents of salt substitutes:

Types of salt substitute	Sodium (mg/5g)	Potassium (mg/5g)
Pan salt	1150	750
Lake salt light	983	1105

Disclaimer: We do not endorse any brands in the market.

Source: Energy & Nutrient Composition of Food, Singapore Health Promotion Board, 2011

Appendix G: HIDDEN SODIUM

Sodium comes in various forms. Do check the ingredient list in food label, and be careful about consuming products that contain sodium.

Below are examples of ingredients that contain hidden sodium (other names for salt):

- Salt
- Pink salt
- Rock salt
- Baking soda
- Sodium chloride
- Sodium nitrate
- Monosodium glutamate (MSG)
- Disodium guanylate (GMP)
- Disodium inosinate (IMP)
- Sodium benzoate
- Sodium bicarbonate
- Sodium erythorbate
- Disodium phosphate
- Sodium alginate
- Sodium hydroxide
- Sodium propionate
- Sodium sulfite
- Sodium citrate
- Sodium diacetate
- Sodium glutamate
- Sodium lactate
- Sodium lauryl Sulfate
- Sodium metabisulfite
- Sodium phosphate
- Trisodium phosphate

Source: AHA 2018 [70]

Appendix H: SAMPLE MENU OF DASH DIET

The following are one-day sample menus of DASH diet. However, adapting the DASH diet to suit the patient's usual dietary intake should be considered.

One day sample menu of DASH diet for 1500 kcal:

Meal	Food and drinks	Quantity
Breakfast	Wholemeal sandwich	2 slices
	+ scrambled egg	2 no.
	+ cucumber & tomatoes slices	½ cup
	Coffee (no added sugar)	1 cup
	+ low fat milk	½ cup
	Banana	1 medium
Lunch	Brown rice	1 cup
	Ayam masak kunyit (lean)	1 palm size
	+ carrot and long beans	½ cup
	Stir-fried spinach	½ cup
	Dragon fruit	½ medium
	Plain lemon tea	1 glass
Teatime snack	Fresh *popiah (popiah basah*)	1 no
	Coffee	
	+ low fat milk	½ cup
Dinner	Mee hoon soup	1 cup
	+ fish fillet slices	5 slices
	+ siew pak choy & bean sprout	½ cup
	Watermelon	1 slice
	Plain water	1 glass

Nutrition content per serving:

Calories (kcal)	1495
Carbohydrate (g)	196.3
Protein (g)	83.2
Fat (g)	43.9
SFA (g)	7.6
Cholesterol (mg)	520.2
Dietary fiber (g)	8.3
Sodium (mg)	1656.9
Potassium (mg)	2656.9
Calcium (mg)	818.8
Magnesium (mg)	205.6

One day sample menu of DASH diet for 1800 kcal:

Meal	Food and drinks	Quantity
Breakfast	Idli	2 pieces
	+ tomato chutney	½ cup
	Tea	
	+ low fat milk	½ cup
	Orange	1 medium
Lunch	Brown rice	1 ½ cup
	Fish curry	1 palm size
	+ eggplant & tomato	½ cup
	Stir-fried ladies finger	½ cup
	Papaya	1 slice
	Lime juice (no added sugar)	1 glass
Teatime snack	Steamed chickpeas	¾ cup
	Ginger tea	1 cup
	+ low fat milk	½ cup
Dinner	Chapati	2 small
	+ Chicken *varuval*	1 palm size
	+ dhal vegetable curry (carrot, cabbage, tomato & eggplant)	1½ cup
	Mango	½ medium
	Plain water	1 glass

Nutrition content per serving:

Calories (kcal)	1781
Carbohydrate (g)	245.2
Protein (g)	94.7
Fat (g)	49.6
SFA (g)	4.4
Cholesterol (mg)	104.3
Dietary fiber (g)	18.7
Sodium (mg)	1312.0
Potassium (mg)	2983.6
Calcium (mg)	739.2
Magnesium (mg)	284.1

Appendix I: EXAMPLES OF AEROBIC EXERCISE

Aerobic exercise	Examples
Moderate-intensity	▪ Brisk walking (at least 4km per hour) ▪ Water aerobics ▪ Dancing (ballroom or social) ▪ Gardening ▪ Tennis (doubles) ▪ Cycling slower than 16km per hour
Vigorous-intensity	▪ Hiking uphill or with a heavy backpack ▪ Running ▪ Swimming laps ▪ Aerobic dancing ▪ Heavy yardwork like continuous digging or hoeing ▪ Tennis (singles) ▪ Cycling 16km per hour or faster ▪ Jumping rope

Source: AHA 2021 [71]

***Prior to starting with any exercise consult your doctor or physiotherapist if you have any underlying medical conditions.

Appendix J: ALCOHOL STANDARD DRINK

Beer 12 fl oz (~350ml)	 about 5% alcohol
Malt liquor 8-9 fl oz (~240 – 270 ml)	 about 7% alcohol
Table wine 5 fl oz (~150ml)	 about 12% alcohol
Distilled spirits 1.5 fl oz shot (~45ml) (e.g. gin, rum, tequila, vodka, whiskey)	 about 40% alcohol

1 standard unit = 14g of pure alcohol

Source: National Institutes of Health [72]

Appendix K: TYPES OF SMOKING

Types of smoking	Description
Tobacco	▪ Tobacco is a plant grown for its leaves, which are dried and fermented before being put in tobacco products. ▪ Tobacco contains nicotine, the ingredient that can lead to addiction. ▪ People can smoke, chew, or sniff tobacco. a) Smoked tobacco products include cigarettes, cigars, bidis, kreteks, loose tobacco in a pipe or hookah (water pipe) b) Chewed tobacco products include chewing tobacco, snuff, dip, and snus. c) Snuff can also be sniffed.
Electronic cigarettes	▪ Electronic cigarettes, also known as e-cigarettes or e-vaporizers. ▪ They are battery-operated devices that deliver nicotine with flavorings and other chemicals to the lungs in vapor instead of smoke.

Source: National Institute on Drug Abuse [73].

Appendix L: LIST OF ANTI-HYPERTENSIVE MEDICATION

Classes	Example of drugs	Mechanism of action
ACE inhibitors	Captropril Enalapril Lisinopril Perindopril Ramipril Imidapril	Inhibits the angiotensin-converting enzyme
Calcium channel blockers (CCBs)	a) Dihydropridines Amlodipine Felodipine Isradipine Lercanidipine Nifedipinne	Inhibits calcium entry to the cells which results in peripheral vasodilation.
	b) Non-dihydropridines Diltiazem Diltiazem SR Verapamil Verapamil SR	Inhibits the sinoatrial and atrioventricular nodes results in slow cardiac contractility and conduction.
Angiotensin II receptor blockers (ARBs)	Candesartan Irbesartan Losartan Telmisartan Valsartan Olmesartan	Blocks angiotensin II receptors which results in decrease of vasoconstricting and aldosterone secreting effects.
Alpha blockers	Doxazosin Prazosin Terazosin	Inhibits alpha receptors, which decrease vascular smooth muscle contractions, results in vasodilation.
Beta blockers	Acebutolol Atenolol Betaxolol Bisoprolol Metoprolol Nebivolol Propranolol	Blocks beta receptors which results in vasodilation of coronary and peripheral arteries.
Alpha, Beta blockers	Labetolol Carvedilol	Subclass of beta-blockers.
Centrally acting agents	Alpha-methyldopa Clonidine Moxonidine	Stimulates alpha2-adrenoceptor in the brain stem and induce peripheral sympathoinhibition which results in a reduction of blood pressure.

Minoxidil	Minoxidil	Opens the adenosine triphosphate-sensitive potassium channels located in the smooth muscles of the vessels and results in vasodilation.
Diuretics	Hydrochlorothiazide Amiloride/hydrochlorothiazide Indapamide SR	Increase salt and water excretion primarily by inhibiting the related mechanisms.

**For drug nutrient interaction kindly refer to latest version of MIMS.*

Sources: Malaysian CPG 2018 [1]; Khalil & Zeltser 2020 [74]; Wong et al 2015 [75].

Appendix M: BLOOD PRESSURE TARGETS

Generally the target BP should be aimed at <140/80 mmHg, with a target of <130/80 mmHg in younger patients and those at higher risk of cardiovascular disease (CPG 2018).

Hypertension with diabetes	Diabetes without renal disease	<130/80 mmHg
Hypertension and renal diseases (BP goals depend on urinary protein excretion)	Patients with proteinuria of <1g/24 hours	<140/90 mmHg
	In patients with proteinuria of >1g/24 hours,	<130/80 mmHg
	In patient >50 years, GFR >20 ml/min/1.73m2 and proteinuria <1g/day	SBP <120 mmHg
Hypertension and heart disease	CHD	<130/80 mmHg
	Heart Failure,	<140/90 mmHg
	Atrial Fibrillation,	<140/90 mmHg
	Peripheral Arterial Disease	<140/90 mmHg
	Left Ventricular Hypertrophy (LVH)	<130/80 mmHg
Hypertension and stroke (Treat blood pressure to prevent both primary and secondary stroke)	In the first 2 weeks in acute ischaemic stroke patients unless hypertensive emergencies co-exist.	Do not lower SBP <180 mmHg
	In patients presenting within 6 hours of haemoraghic stroke and BP of <220 mmHg.	Do not lower SBP to <140 mmHg
	In both normotensive and hypertensive patients for secondary prevention.	Lower BP to be <140/90 mmHg
	For secondary prevention in lacunar stroke.	Lower BP to <130/80 mmHg
For older adults (SBP target)	>80 years old	<150
	65-80 years old	<140
	Multiple comorbidities Functional and cognitive impairment Frail Institutionalised Experiencing adverse drug reactions	Consider less strict targets.
	For fit* 65-80 years old patients	<130 mmHg

* Free from health conditions that limit mobility and/or functional ability with good nutrition and cognitive status.

Source: Malaysian CPG 2018 [1]

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Post-Guideline Development Update

Recent evidence (2025–2026) in hypertension highlights a shift toward more comprehensive cardiovascular risk–based management, moving beyond isolated clinic blood pressure readings to incorporate global risk stratification, out-of-office measurements (including home and ambulatory blood pressure monitoring), and recognition of blood pressure variability as a prognostic marker

It also reinforces the importance of dietary patterns that extend beyond single nutrient-based approaches to encompass overall dietary quality and habitual eating patterns. In addition, increasing attention has been given to the role of food processing, particularly the impact of ultra-processed foods on cardiometabolic health.

Dietitians are encouraged to remain abreast of evolving evidence and updated clinical guidelines to ensure that medical nutrition therapy remains evidence-based and responsive to current advances in hypertension and cardiometabolic care.

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To be advocators of nutrition and dietetics for the health and well-being of the nation

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