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PUBLIC HEALTH AUTHORITY

Saudi Health Promotion and Prevention Guidelines for Hypertension

For Health Professionals and Health Educators

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Preface

At the core of our aspirations is to build a healthy population by emphasizing the significance of health promotion and protection in the context of sustainable development goals, which cannot be overstated. With the aim of achieving optimal health status and capabilities for our community, a fundamental focus has been placed on preventing and controlling the community's health, specifically through the Promotion and Prevention of Hypertension.

As a responsibility of the Public Health Authority, it is imperative that we take proactive steps to ensure community well-being. This includes promoting healthy lifestyle choices, offering support for those facing challenges related to hypertension or other health issues, and inform sound decisions. By prioritizing health and wellness, we are not only enhancing the lives of our community members, but also cultivating a more productive and resilient workforce.

This guideline consolidates the best available national knowledge to develop a series of best practice guidelines for adaptation and implementation by healthcare professionals in their practice. Additionally, it is intended for use mainly by health professionals and health educators. Our goal is to prevent hypertension and foster the development of best practice models that can influence and support conscious and informed decisions regarding healthy living, thereby promoting the best possible lives for our community.

The Saudi Health Promotion and Prevention Guidelines for Hypertension serves as a comprehensive source, offering evidence-based recommendations for the prevention and control of hypertension. Hypertension is the primary risk factor for cardiovascular diseases (CVDs), which are the leading cause of mortality in Saudi Arabia. However, it can be managed through modifiable lifestyle changes.

The Saudi Public Health Authority is dedicated to promote the health and well-being of all Saudi citizens and residents equally. It complements ongoing collaborative efforts to support our community, enabling everyone to lead longer, healthier, and ultimately more fulfilling lives.

Dr. Abdullah AlGwizani

Saudi Public Health Authority
General Chief Executive Office

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Foreword

Hypertension, also known as high blood pressure, is a significant public health concern in Saudi Arabia. Hypertension is the leading risk factor for many chronic conditions including heart diseases and stroke, which are the two leading causes of mortality in Saudi Arabia and globally.

Hypertension is a serious condition, however it is also preventable and treatable. Despite national efforts for hypertension screening, still a high percentage of individuals with high blood pressure remain undiagnosed. This situation necessitates the development of a national hypertension promotion and prevention guideline in Saudi Arabia.

A national hypertension promotion and prevention guideline in Saudi Arabia would be a well-supported guidance for healthcare providers and health educators to be well applies on the general public. The guideline would provide evidence-based recommendations on how to prevent and control hypertension.

This guideline aims to address high blood pressure prevention with a specific focus on the Saudi context, incorporating evidence-based recommendations for both individual-level and population-level interventions, by focusing on individual-level interventions and lifestyle changes, as well as broader policy interventions. with the goal of reducing the burden of hypertension and reduction in the incidence of associated health complications in the country, as well as given its potential to mitigate the impact of hypertension on the population's health and well-being.

Additionally, the creation of such a guideline does have numerous benefits, including a reduced burden of heart disease and other non-communicable diseases, decreased healthcare costs, improved quality of life for individuals with hypertension, and increased life expectancy.

A key aspect of this guideline is to encourage practical strategies to combat modifiable cardiovascular risk factors like obesity, physical inactivity, and unhealthy diet. It emphasizes the importance of sustaining healthy behaviours over time to prevent hypertension and improve overall population health. This document also recognizes the unique characteristics of the Saudi population, highlighting the need for tailored recommendations and further research. Additionally, this guideline calls for standardizing blood pressure measurement in clinical and non-clinical settings and assessing the cost-effectiveness of different screening approaches in Saudi Arabia. This commitment to research and improving healthcare outcomes underscores the guidelines potential impact on public health in the Saudi context.

In conclusion, the development of a national hypertension promotion and prevention guideline in Saudi Arabia is not only a high priority but also a vital step in addressing a pressing public health concern. With its focus on tailored recommendations for the Saudi population, emphasis on lifestyle changes, and the potential to enhance healthcare outcomes, this guideline has the capacity to make a meaningful impact in reducing the prevalence of hypertension and improving the overall health and well-being of the Saudi population.

1 Introduction

This is a scientific document that contains recommendations concerning health promotion and prevention interventions for high blood pressure. The recommendations herein are diverse in scope where some can be implemented in clinical settings, while others focus on the general population including policy recommendations. We provide evidence-based recommendations and information that can help healthcare providers, policymakers, and other stakeholders make informed decisions about the preventive care of high blood pressure in the general population. However, this document is not intended to be a comprehensive literature review of published interventions or an operational manual of how to implement these recommendations at a population or organizational levels.

1.1 Scope of the guideline

The present guideline is intended to be a resource for the clinical and public health practice communities to deliver primary and secondary prevention practices for high blood pressure. The concepts of health promotion are at the core of this guideline document where the recommendations presented are not only focusing on individual behaviour but moves towards a wide range of social and environmental interventions. However, we do not include guidance on the management of high blood pressure in this document. The recommendations in this document can be applied on groups from the general population including children, adolescents, adults, and pregnant women as appropriate. Therefore, it is advised that clinical and public health communities and policy makers from the public or private sectors read and apply these recommendations on the aforementioned groups to promote health related to blood pressure.

This document of guidelines is intended to be comprehensive of best available practices but succinct and practical in providing guidance for prevention of high blood pressure. Meaning that literature review and synthesis of the literature were used to support the construction of this national guideline, yet will not be included in the document. The current document does not include tertiary prevention practices including control and management of high blood pressure or preventive practices for other cardiometabolic risk factors of cardiovascular disease (CVD) including lipids, diabetes, smoking, or adiposity. This document does not offer translation or operating procedures of implementing the recommendations where these are left at the discretion of the implementing body.

Key question formulation for this guideline using the PICO framework is: In the general population of Saudi Arabia, what are health promotion recommendations at the individual and population levels that would help prevent or early detect high blood pressure?

1.2 Methodology of evidence review

The evidence review included literature derived from research involving human subjects, published in English, and indexed in MEDLINE (through PubMed) which was conducted between May and August 2023. Key search words included but were not limited to the following: adherence; alcohol intake; ambulatory care; blood pressure: arterial, determination, devices, high, measurement, monitoring, ambulatory; diet; hypertension: white coat, masked, ambulatory, diagnosis, prevention; intervention; lifestyle: measures, modification; office visits; physical

activity; potassium intake; prevention: primary, secondary; protein intake; risk reduction: behaviour, counselling; Saudi Arabia; screening; sphygmomanometers; weight.

The writing group consisted of public health and preventive medicine doctors, cardiologists, epidemiologists, and health couches. It included representatives from Public Health Authority, Ministry of Health, Ministry of Education, National Heart Center, and Saudi Hypertension Management Society.

Existing guideline documents with potential overlap with this guideline:

- Published international guidelines: this document will benefit from the efforts set by previous guidelines in areas where the evaluated evidence is assumed to have similar impacts on the population of Saudi Arabia.
- Published national guidelines: there is the Saudi Hypertension Guideline of 2018 where it focused on clinical practices in the hospital setting (tertiary prevention). Another Saudi guideline is the Cardiometabolic Risk Management in Primary Care of 2021, which is a patient-centred translational guide for the primary health care provider for the control and management of cardiometabolic risk factors. Recently, the National Heart Center and the Saudi Heart Association published the 2023 NHC/SHA Hypertension Guidelines where it focused on management and control of hypertension including in patients with comorbidities.

This document can have overlapping topics and recommendations related to high blood pressure with the previously published documents. However, unlike previously published guidelines, this document is intended to focus primarily on health promotion related to blood pressure and present guidelines specifically related to primary and secondary prevention of high blood pressure.

1.3 Classes of recommendation and levels of evidence

Table 1 Classes of recommendations

Definition		Wording
Class I Benefit >>> Risk	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	• Is recommended • Is indicated/effective
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure	
Class IIa Benefit >> Risk	Weight of evidence/opinion is in favor of usefulness/efficacy	• Is reasonable • Can be useful/effective
Class IIb Benefit ≥ Risk	usefulness/efficacy is less well established by evidence/opinion.	• May/might be considered • May/might be reasonable
Class III Benefit < Risk	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	• Is not recommended • Potentially harmful

Table 2 Levels of evidence

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of the experts and/or small studies, retrospective studies, registries.

1.4 High-risk approach and the general population approach

Prevention and control of hypertension can be achieved by application of targeted and/or population-based strategies. The targeted approach is the traditional strategy used in health care practice and seeks to achieve a clinically important reduction in BP for individuals at the upper end of the BP distribution. The targeted approach is used in the management of patients with hypertension, but the same approach is well-proven as an effective strategy for prevention of hypertension in those at high risk of developing hypertension.[1] The population-based strategy is derived from public health mass environmental control experience. It aims to achieve a smaller reduction in BP that is applied to the entire population, resulting in a small downward shift in the entire BP distribution.[1]

An appeal of the population-based approach is that modeling studies have consistently suggested that it provides greater potential to prevent hypertension compared with the targeted strategy.[2] This finding is based on the principle that a large number of people exposed to a small increased hypertension risk may generate many more cases than a small number of people exposed to a large increased risk. For example, a general population DBP-lowering of as little as 2 mm Hg would be expected to result in a 17% reduction in the incidence of hypertension, a 14% reduction in stroke risk, and a 6% reduction in the risk of coronary heart disease.[3] Because they use the same interventions, the targeted and population-based strategies are complementary and mutually reinforcing.

2 Classification of BP

2.1 Definition of high BP

Recommendation for Definition of High BP		
Class of recommendation	Level of evidence	Recommendation
I	B	BP should be categorized as normal, elevated, or stage 1 or 2 hypertension to prevent and treat high BP.[4]

Although a continuous association exists between higher BP and increased CVD risk, it is useful to categorize BP levels for clinical and public health decision making. In the present document, BP is categorized into 4 levels on the basis of average BP measured in a healthcare setting (office pressures): normal, elevated, and stage 1 or 2 hypertension (Table 3). The increased risk of CVD among adults with stage 2 hypertension is well established. An increasing number of individual studies and meta-analyses of observational data have reported a gradient of progressively higher CVD risk going from normal BP to elevated BP and stage 1 hypertension.[5–7] In many of these meta-analyses, the hazard ratios for CHD and stroke were between 1.1 and 1.5 for the comparison of SBP/DBP of 120–129/80–84 mm Hg versus <120/80 mm Hg and between 1.5 and 2.0 for the comparison of SBP/DBP of 130–139/85–89 mm Hg versus <120/80 mm Hg. This risk gradient was consistent across subgroups defined by sex. The relative increase in CVD risk associated with higher BP was attenuated but still present among older adults.[8]

Meta-analyses of observational studies have demonstrated that elevated BP and hypertension are associated with increased risk of CVD, end-stage renal disease (ESRD), subclinical atherosclerosis, and all-cause death.[7,9,10] The recommended BP classification system is most valuable in untreated adults as an aid in decisions about prevention or treatment of high BP. However, it is also useful in assessing the success of interventions to reduce BP.

*Table 3 Categories of BP in adults measured in a healthcare setting (office pressures)**

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.

2.2 Prevalence

Prevalence estimates of hypertension are greatly influenced by the choice of cut points to categorize high BP, the methods used to establish the diagnosis, and the geographical location studied. The best recent estimate for the prevalence of hypertension in the general population of Saudi Arabia was 15.2% among Saudis aged 15 years or older using data derived from the 2013 Saudi Health Information Survey (SHIS).[11] This estimate used the following criteria to define hypertension: (1) measured diastolic or systolic blood pressure exceeding 89 or 139 mmHg, respectively, or (2) the respondent reported taking medications for hypertension. In the same study, respondents were considered borderline hypertensive if their measured diastolic blood pressure was between 80 and less than 90 mmHg or systolic blood pressure was between 120 and 139 mmHg while not taking medications for hypertension; the prevalence of borderline hypertension was 40.6%.[11] In 2007, a probability sample of Saudi adult population across the Kingdome showed a prevalence of 26.1% for hypertension diagnosed at the 140/90 mmHg cutoff values.[12] Other more recent national studies relied on self-reported data,[13] used unconventional cutoff values for SBP/DBP,[14] or included only a segment of the population of Saudi Arabia.[15] These limitations will greatly influence the validity of national hypertension prevalence estimates. To the date of writing this guideline, no national prevalence estimates using the current guideline cutoff points of hypertension were published.

3 Measurement of BP

3.1 Office

Recommendation for Accurate Measurement of BP in the Office		
Class of recommendation	Level of evidence	Recommendation
I	C	For diagnosis and management of high BP, methods described in Table 4 are recommended for accurate measurement and documentation of BP

Although measurement of BP in office settings is relatively easy, errors are common and can result in a misleading estimation of an individual's true level of BP. There are various methods for measuring BP in the office. The clinical standard of auscultatory measures calibrated to a column of mercury has given way to oscillometric devices (in part because of toxicological issues with mercury). Oscillometric devices use a sensor that detects oscillations in pulsatile blood volume during cuff inflation and deflation. BP is indirectly calculated from maximum amplitude algorithms that involve population-based data. For this reason, only devices with a validated measurement protocol can be recommended for use. Many of the newer oscillometric devices automatically inflate multiple times (in 1- to 2-minute intervals), allowing patients to be alone and undisturbed during measurement. Although much of the available BP-related risk information and antihypertensive treatment trial experience have been generated by using "traditional" office methods of BP measurement, there is a growing evidence base supporting the use of automated office BP measurements.[16]

Table 4 Steps and methods for accurate measurement and recording of BP

Steps of accurate BP measurement	Methods
Patient preparation	• Patients must be in a relaxed position and seated in a chair with their feet on the floor and back supported for a minimum of 5 minutes. • Patients are asked to abstain from caffeine, exercise, and smoking for at least 30 minutes prior to measurement. • Confirmed that the patient has emptied his/her bladder. • During both the rest period and the measurement, neither the patient nor the observer should engage in conversation. • Any clothing obstructing the location of cuff placement should be removed. • Measurements taken while the patient is situated on an examining table do not comply with these criteria.

Proper technique for BP measurements	• Ensure that the device is validated and calibrated periodically. • Have the patient's arm supported, for example, resting on an armed chair. • Position the middle of the cuff on the patient's upper arm corresponding to the midpoint of the sternum. • For most patients, use a standard bladder cuff with a width of 12-13 cm and a length of 35 cm. For patients with larger arm circumferences (>32 cm), use a larger cuff, and for those with smaller arm circumferences (<26 cm), use a smaller cuff.
Take the proper measurements	• At the first visit, measure blood pressure in both arms and use the arm with the higher reading for subsequent measurements. • Three BP measurements should be recorded and allow 1-2 minutes between repeated measurements. • During auscultatory readings, deflate the cuff pressure at a rate of 2 mm Hg per second, and listen for Korotkoff sounds. Automatic devices currently replaced auscultatory methods.
Properly document accurate BP readings	• Record SBP and DBP. When using the auscultatory technique, record SBP as the onset of the first Korotkoff sound and DBP as the disappearance of all Korotkoff sounds, using the nearest even number. In case of automatic devices use, accurately document the displayed readings.
Average the readings	• To estimate an individual's blood pressure level, use the average of the last two BP readings.

Accurate measurement and recording of BP are essential to categorize level of BP, ascertain BP-related CVD risk, and guide management of high BP. Most systematic errors in BP measurement can be avoided by following the suggestions provided in Table 4, including having the patient sit quietly for 5 minutes before a reading is taken, supporting the limb used to measure BP, ensuring the BP cuff is at heart level, using the correct cuff size (Table 5), and, for auscultatory readings, deflating the cuff slowly.[17] In those who are already taking medication that affects BP, the timing of BP measurements in relation to ingestion of the patient's medication should be standardized. Because individual BP measurements tend to vary in an unpredictable or random fashion, a single reading is inadequate for clinical decision-making. An average of 2 to 3 BP measurements obtained on 2 to 3 separate occasions will minimize random error and provide a more accurate basis for estimation of BP. In addition to clinicians, other caregivers and patients who perform BP self-monitoring should be trained to follow the checklist in Table 4.

Table 5 Selection Criteria for BP Cuff Size for Measurement of BP in Adults

Arm Circumference	Usual Cuff Size
22–26 cm	Small adult
27–34 cm	Adult
35–44 cm	Large adult
45–52 cm	Adult thigh

3.2 Home

Recommendation for Home and Self-Monitoring of BP		
Class of recommendation	Level of evidence	Recommendation
I	A	Home BP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions.[18–20]

Out-of-office measurement of BP can be helpful for confirmation and management of hypertension. Self-monitoring of BP refers to the regular measurement of BP by an individual at home or elsewhere outside the clinic setting. Among individuals with hypertension, self-monitoring of BP, without other interventions, has shown limited evidence for treatment-related BP reduction and achievement of BP control.[18,21,22] However, with the increased recognition of inconsistencies between office and out-of-office BPs (see Masked and White Coat Hypertension Section) and greater reduction in BP being recommended for hypertension control, increased attention is being paid to out-of-office BP readings. Although ambulatory blood pressure monitoring (ABPM) is generally accepted as the best out-of-office measurement method, home blood pressure monitoring (HBPM) is often a more practical approach in clinical practice. Recommended procedures for the collection of HBPM data are provided in Table 6. If self-monitoring is used, it is important to ensure that the BP measurement device used has been validated with an internationally accepted protocol and the results have been published in a peer-reviewed journal.[23] A guide to the relationship between HBPM BP readings and corresponding readings obtained in the office and by ABPM is presented in Table 7. The precise relationships between office readings, ABPM, and HBPM are unsettled, but there is general agreement that office BPs are often higher than ABPM or HBPM BPs, especially at higher BPs.

Table 6 Procedures for use of HBPM

Patient training should occur under medical supervision, including:	Devices:
• Information about hypertension • Selection of equipment • Acknowledgment that individual BP readings may vary substantially • Interpretation of results	• Verify use of automated validated devices. • Monitors with provision for storage of readings in memory are preferred. • Verify use of appropriate cuff size to fit the arm (Table 5). • Verify that left/right inter-arm differences are insignificant. If differences are significant, instruct patient to measure BPs in the arm with higher readings.
Instructions on HBPM procedures:	
Remain still: • Avoid smoking, caffeinated beverages, or exercise within 30 min before BP measurements • Ensure ≥5 min of quiet rest before BP measurements. Sit correctly: • Sit with back straight and supported (on a straight-backed dining chair, for example, rather than a sofa). • Sit with feet flat on the floor and legs uncrossed. • Keep arm supported on a flat surface (such as a table), with the upper arm at heart level. • Bottom of the cuff should be placed directly above the antecubital fossa (bend of the elbow). Take multiple readings: • Take at least 2 readings 1 min apart in morning before taking medications and in evening before supper. Optimally, measure and record BP daily. Ideally, obtain weekly BP readings beginning 2 weeks after a change in the treatment regimen and during the week before a clinic visit. Record all readings accurately: • Monitors with built-in memory should be brought to all clinic appointments. • BP should be based on an average of readings on ≥2 occasions for clinical decision making. The information above may be reinforced with videos available online.	

Table 7 Corresponding Values of SBP/DBP for Clinic, HBPM, Daytime, Nighttime, and 24-Hour ABPM Measurements

Clinic	HBPM	Daytime ABPM	Nighttime ABPM	24-Hour ABPM
120/80	120/80	120/80	100/65	115/75
130/80	130/80	130/80	110/65	125/75
140/90	135/85	135/85	120/70	130/80
160/100	145/90	145/90	140/85	145/90

ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP, diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

ABPM is used to obtain out-of-office BP readings at set intervals, usually over a period of 24 hours. HBPM is used to obtain a record of out-of-office BP readings taken by a patient. Both ABPM and HBPM typically provide BP estimates that are based on multiple measurements. A systematic review conducted by the US Preventive Services Task Force reported that ABPM provided a better method to predict long-term CVD outcomes than did office BPs. It incorporates new information from studies of HBPM, ABPM, the relationship of overall CVD risk to the effectiveness of blood pressure lowering, clinical outcomes related to different blood pressure goals, strategies to improve blood pressure control and various other areas. A small body of evidence suggested, but did not confirm, that HBPM could serve as a similar predictor of outcomes.[24] Meta-analyses of RCTs have identified clinically useful reductions in SBP and DBP and achievement of BP goals at 6 months and 1 year when self-monitoring of BP has been used in conjunction with other interventions, compared with usual care. Meta-analyses of RCTs have identified only small net reductions in SBP and DBP at 6 months and 1 year for use of self-monitoring of BP on its own, as compared with usual care.[18,21,22]

3.3 Ambulatory blood pressure monitoring

All the major RCTs have been based on use of clinic BP readings. However, ABPM is often used to supplement BP readings obtained in office settings.[25] The monitors are usually programmed to obtain readings every 15 to 30 minutes throughout the day and every 30 minutes to 1 hour during the night. ABPM is conducted while individuals go about their normal daily activities. ABPM can a) provide estimates of mean BP over the entire monitoring period and separately during nighttime and daytime, b) determine the daytime-to-nighttime BP ratio to identify the extent of nocturnal "dipping," c) identify the early-morning BP surge pattern, d) estimate BP variability, and e) allow for recognition of symptomatic hypotension.

ABPM and HBPM definitions of high BP use different BP thresholds than those used by the previously mentioned office based approach to categorize high BP identified in Section 3.1. Table 7 provides best estimates for corresponding home, daytime, nighttime, and 24-hour ambulatory levels of BP, including the values recommended for identification of hypertension with office measurements. Typically, a clinic BP of 140/90 mm Hg corresponds to home BP values of 135/85 mm Hg and to ABPM values defined as a daytime SBP/DBP of 135/85 mm Hg, a nighttime SBP/DBP of 120/70 mm Hg, and a 24-hour SBP/DBP of 130/80 mm Hg.[26,27] These thresholds are based on data from European, Australian, and Asian populations. They are provided as a guide but should be interpreted with caution. Higher daytime SBP measurements from ABPM can be associated with an increased risk of CVD and all-cause death independent of clinic-measured BP.[28] A meta-analysis of observational studies that included 13,844 individuals suggested nighttime BP is a stronger risk factor for CHD and stroke than either clinic or daytime BP.[29]

3.4 White-coat HTN and masked HTN

White-coat hypertension refers to BP that is elevated in the office but is normal when measured by ABPM or HBPM. It occurs in up to 30-40% of patients. The risk associated with white-coat hypertension is lower than sustained hypertension but may be higher than normotension. People with white-coat hypertension should receive lifestyle advice to reduce their CV risk and be offered BP measurement at least every 2 years by ABPM or HBPM because of high rates of transition to sustained hypertension. Routine drug treatment for white-coat hypertension is not indicated.

Masked hypertension refers to patients with a normal office BP but an elevated BP on ABPM or HBPM. These patients often have hypertension-mediated organ damage and are at a CV risk level at least equivalent to sustained hypertension. It is more common in younger people and in those with high-normal office BP. In masked hypertension, lifestyle changes are recommended, and drug treatment should be considered to control 'out-of-office' BP, with periodic monitoring of BP, usually with HBPM.

4 Screening for hypertension

Recommendations for screening of hypertension in adults[30]		
Class of recommendation	Level of evidence	Recommendation
I	A	In adults 18 years or older, it is recommended to screen for hypertension with office blood pressure measurement. It is recommended to obtain blood pressure measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

4.1 Details related to screening for hypertension

Implementing this recommendation is done in two steps. First, screen by measuring blood pressure with an office blood pressure measurement (OBPM). Then, confirm by taking blood pressure measurements outside of the clinical setting to confirm a hypertension diagnosis before starting treatment. Ways to measure blood pressure outside of the clinical setting include ambulatory blood pressure monitoring (ABPM) or home blood pressure monitoring (HBPM).

Although evidence on optimal screening intervals is limited, reasonable options include screening for hypertension every year in adults 40 years or older and in adults at increased risk for hypertension (persons with high-normal blood pressure, or persons who are overweight or obese). Screening less frequently (i.e., every 3-5 years) as appropriate for adults aged 18 to 39 years not at increased risk for hypertension and with a prior normal blood pressure reading.

4.2 Accuracy of screening tests

Evidence from 20 studies (n = 12,614) on community-based samples were reviewed to test accuracy of OBPM for initial screening for hypertension.[31] Meta-analyses of 15 studies (n = 11 309) showed a pooled sensitivity of 0.54 (95% CI, 0.37-0.70) and a pooled specificity of 0.90 (95% CI, 0.84-0.95) when using an OBPM threshold of 140/90 mm Hg compared with a reference 24-hour ABPM of 130/80 mm Hg or reference daytime ABPM of 135/85 mm Hg.[31]

Eighteen studies (n = 57 128) provided evidence on the accuracy of various methods to evaluate adults who initially screened positive for hypertension by OBPM. Meta-analysis of 8 studies (n = 53 183) of repeat OBPM showed a pooled sensitivity of 0.80 (95% CI, 0.68-0.88) and pooled specificity of 0.55 (95% CI, 0.42-0.66) using an OBPM threshold of 140/90 mm Hg compared with a reference 24-hour ABPM of 130/80 mm Hg or reference daytime ABPM of 135/85 mm Hg. Meta-analysis of 4 studies (n = 1001) on HBPM found a pooled sensitivity of 0.84 (95% CI, 0.760.90) and a pooled specificity of 0.60 (95% CI, 0.48-0.71) using an HBPM threshold of 135/85 mm Hg compared with a reference 24-hour ABPM of 130/80 mm Hg or reference daytime ABPM of 135/85 mm Hg. Limited evidence is available on the accuracy of automated office-based blood pressure measurement (taking repeated measurements while the patient is alone in a quiet room).[31]

4.3 Benefits of early detection

No trials have compared the effectiveness of screening for hypertension vs no screening. However, a Canadian community-based, cluster randomized clinical trial evaluated a multicomponent cardiovascular disease health promotion program that assessed cardiovascular disease outcomes of 140,642 community members in 39 clusters.[31,32] At 1 year of follow-up, a 9% reduction in the number of hospital admissions for acute myocardial infarction, congestive heart failure, or stroke was found; however, no difference in all-cause mortality was noted.[33] Although there is limited direct trial evidence on benefits of screening for hypertension on health outcomes, based on the available indirect evidence on the accuracy of screening tests for hypertension and robust foundational evidence showing that treatment of hypertension (detected in office-based settings) improves health outcomes,[34] we found convincing evidence that screening for hypertension in adults provides health benefits.

4.4 Harms of early detection

Evidence from 13 studies (n = 5,150) were reviewed that reported on harms of screening for hypertension.[31,31] Results from 5 studies (n = 1,321) suggested that screening is not associated with any substantial short-term quality of life changes or adverse psychological outcomes. Evidence from 2 work-site studies (n = 502) reported mixed findings on whether absenteeism increased with screening. Seven studies (n = 3,505) reported minor adverse events such as sleep disturbance, pain/discomfort, bruising, and skin irritation with ABPM. Overall, the harms of screening for hypertension are minor.

5 Risk factors of hypertension

5.1 Genetic

Hypertension is a complex polygenic disorder in which many genes or gene combinations influence BP.[35] Although several monogenic forms of hypertension have been identified, such as glucocorticoid-remediable aldosteronism, Liddle's syndrome, Gordon's syndrome, and others in which single gene mutations fully explain the pathophysiology of hypertension, these disorders are rare.[36] The current tabulation of known genetic variants contributing to BP and hypertension includes more than 25 rare mutations and 120 single-nucleotide polymorphisms.[36,37] However, even with the discovery of multiple single-nucleotide polymorphisms influencing control of BP since completion of the Human Genome Project in 2003, the associated variants have only small effects. Indeed, at present, the collective effect of all BP loci identified through genome-wide association studies accounts for only about 3.5% of BP variability.[37] The presence of a high number of small-effect alleles associated with higher BP results in a more rapid increase in BP with age.[38]

5.2 Non-genetic (Environmental) Risk Factors

Various environmental exposures, including components of diet, physical activity, and alcohol consumption, influence BP. Many dietary components have been associated with high BP. Some of the diet-related factors associated with high BP include overweight and obesity, excess intake of sodium, and insufficient intake of potassium, calcium, magnesium, protein (especially from vegetables), fiber, and fish fats. Poor diet, physical inactivity, and excess intake of alcohol, alone or in combination, are the underlying cause of a large proportion of hypertension. Gut microbiota have also been linked to hypertension, especially in experimental animals.[39] Short sleep duration (<6 h) and poor-quality sleep are associated with high blood pressure.[40] Psychosocial or work-related stressors were also linked to hypertension.[41] For the Saudi population, residing near oil refineries that emit polycyclic aromatic hydrocarbons was associated with higher BP.[42] Some studies suggest that incense burning may increase the risk of hypertension and blood pressure, especially in women and during pregnancy.[43,44] Some of the best-proven environmental relationships with high BP are briefly reviewed below.

5.2.1 Overweight and Obesity

Numerous reports have identified a striking relationship between body weight and high BP[45] and a direct relationship between overweight/obesity and hypertension.[14,15,46,47] Epidemiological studies, including the Framingham Heart Study[48] and the Nurses' Health Study,[49] have consistently identified a direct relationship between body mass index and BP that is continuous and almost linear, with no evidence of a threshold.[50] The relationship with BP is even stronger for waist-to hip ratio and computed tomographic measures of central fat distribution.[51]Attributable risk estimates from the Nurses' Health Study suggest that obesity may be responsible for about 40% of hypertension, and in the Framingham Offspring Study, the corresponding estimates were even higher (78% in men and 65% in women).[52,53] The relationship between obesity at a young age and change in obesity status over time is strongly related to future risk of hypertension. In combined data from 4 longitudinal studies begun in adolescence

with repeat examination in young adulthood to early middle age, being obese continuously or acquiring obesity was associated with a relative risk of 2.7 for developing hypertension. Becoming normal weight reduced the risk of developing hypertension to a level similar to those who had never been obese.[54]

5.2.2 Sodium Intake and sodium sensitivity

Sodium intake is positively associated with BP cross-sectional,[55] and prospective cohort studies[56] and accounts for much of the age-related increase in BP.[57] Certain groups with various demographic, physiological, and genetic characteristics tend to be particularly sensitive to the effects of dietary sodium on BP.[58] Salt sensitivity is a quantitative trait in which an increase in sodium load disproportionately increases BP.[58] Salt sensitivity is especially common in older adults, and those with a higher level of BP or comorbidities such as CKD, DM, or the metabolic syndrome.[58] Salt sensitivity may be a marker for increased CVD and all-cause mortality risk independently of BP, and the trait has been demonstrated to be reproducible. Current techniques for recognition of salt sensitivity are impractical in routine clinical practice, so salt sensitivity is best considered as a group characteristic.[58]

5.2.3 Potassium

Potassium intake is inversely related to BP in cross-sectional,[59] and prospective cohort[60] studies. A higher level of potassium seems to mitigate the effect of sodium on BP, with a lower sodium–potassium ratio being associated with a lower level of BP than that noted for corresponding levels of sodium or potassium on their own.[61] Likewise, epidemiological studies suggest that a lower sodium–potassium ratio may result in a reduced risk of CVD as compared with the pattern for corresponding levels of either cation on its own.[62]

5.2.4 Physical Fitness

Epidemiological studies have demonstrated an inverse relationship between physical activity and physical fitness and level of BP and hypertension.[63] Even modest levels of physical activity have been associated with a decrease in the risk of incident hypertension.[64] Physical fitness, measured objectively by graded exercise testing, attenuates the rise of BP with age and prevents the development of hypertension. In the CARDIA (Coronary Artery Risk Development in Young Adults) study, physical fitness measured at 18 to 30 years of age in the highest quintile of an otherwise healthy population was associated with 66% lower risk of developing hypertension 15 years later, and 50% lower the risk after adjustment for body mass index, as compared with the lowest quintile.[65] In a cohort of men 20 to 90 years of age who were followed longitudinally for 3 to 28 years, higher physical fitness decreased the rate of rise in SBP over time and delayed the time to onset of hypertension.[66]

5.2.5 Alcohol

The presence of a direct relationship between alcohol consumption and BP was first reported in 1915 and has been repeatedly identified in contemporary cross-sectional and prospective cohort studies.[67] Estimates of the contribution of alcohol consumption to population incidence and prevalence of hypertension vary according to level of intake. In the United States, it seems likely

that alcohol may account for close to 10% of the population burden of hypertension (higher in men than in women).[67]

5.3 Childhood risk factors and BP in adulthood

BP distribution in the general population increases with age. Multiple longitudinal studies have investigated the relationship of childhood BP to adult BP. A meta-analysis of 50 such studies showed correlation coefficients of about 0.38 for SBP and 0.28 for DBP, with BPs in the upper range of the pediatric distribution (particularly BPs obtained in adolescence) predicting hypertension in adulthood.[68] Several factors, including genetic factors and development of obesity, increase the likelihood that a high childhood BP will lead to future hypertension.[69] Premature birth is associated with a 4 mm Hg higher SBP and a 3 mm Hg higher DBP in adulthood, with somewhat larger effects in women than in men. Low birth weight from other causes also contributes to higher BP in later life.[70]

6 BP and CVD risk

6.1 Observational Relationship

Observational studies have demonstrated graded associations between higher systolic blood pressure (SBP) and diastolic blood pressure (DBP) and increased CVD risk. In a meta-analysis of 61 prospective studies, the risk of CVD increased in a log-linear fashion from SBP levels <115 mm Hg to >180 mm Hg and from DBP levels <75 mm Hg to >105 mm Hg.[8] In that analysis, 20 mm Hg higher SBP and 10 mm Hg higher DBP were each associated with a doubling in the risk of death from stroke, heart disease, or other vascular disease. In a separate observational study including >1 million adult patients ≥30 years of age, higher SBP and DBP were associated with increased risk of CVD incidence and angina, myocardial infarction (MI), HF, stroke, peripheral artery disease (PAD), and abdominal aortic aneurysm, each evaluated separately.[71] An increased risk of CVD associated with higher SBP and DBP has been reported across a broad age spectrum, from 30 years to >80 years of age. Although the relative risk of incident CVD associated with higher SBP and DBP is smaller at older ages, the corresponding high BP–related increase in absolute risk is larger in older persons (≥65 years) given the higher absolute risk of CVD at an older age.[8]

6.2 Population Risk

In 2010, high BP was the leading cause of death and disability-adjusted life years worldwide.[72,73(p67)] Hypertension accounts for more CVD deaths than any other modifiable CVD risk factor and is second only to cigarette smoking as a preventable cause of death for any reason.[74] Because of the high prevalence of hypertension and its associated increased risk of CHD, stroke, and end-stage renal disease (ESRD), the population-attributable risk of these outcomes associated with hypertension is high.[75] In the population-based ARIC (Atherosclerosis Risk in Communities) study, 25% of the cardiovascular events (CHD, coronary revascularization, stroke, or HF) were attributable to hypertension. In the Northern Manhattan study, the percentage of events attributable to hypertension was higher in women (32%) than in men (19%).[76]

6.3 Coexistence of Hypertension and Related Chronic Conditions

Recommendations for coexistence of hypertension and related chronic conditions		
Class of recommendation	Level of evidence	Recommendation
I	B	Screening for and management of other modifiable CVD risk factors are recommended in adults with hypertension.[77]

Many adult patients with hypertension have other CVD risk factors; a list of such modifiable and relatively fixed risk factors is provided in Table 8. Modifiable risk factors for CVD that are common among adults with hypertension include cigarette smoking/tobacco smoke exposure, DM, dyslipidemia (including high levels of low-density lipoprotein cholesterol or hypercholesterolemia, high levels of triglycerides, and low levels of high-density lipoprotein cholesterol), overweight/ obesity, physical inactivity/low fitness level, and unhealthy diet.[78–80] The relationship between hypertension and other modifiable risk factors is complex and interdependent, with several sharing mechanisms of action and pathophysiology. CVD risk factors affect BP through over activation of the renin-angiotensin-aldosterone system, activation of the sympathetic nervous system, inhibition of the cardiac natriuretic peptide system, endothelial dysfunction, and other mechanisms.[81] Treating some of the other modifiable risk factors may reduce BP through modification of shared pathology, and CVD risk may be reduced by treating global risk factor burden.

Observational studies have demonstrated that CVD risk factors frequently occur in combination, with ≥3 risk factors present in 17% of patients. A meta-analysis from 18 cohort studies involving 257 384 patients identified a lifetime risk of CVD death, nonfatal MI, and fatal or nonfatal stroke that was substantially higher in adults with ≥2 CVD risk factors than in those with only 1 risk factor.[77]

Table 8. CVD risk factors common in patients with hypertension

Modifiable Risk Factors	Relatively Fixed Risk Factors
Current cigarette smoking, secondhand smoking	CKD
	Family history
Diabetes mellitus	Increased age
Dyslipidemia/hypercholesterolemia	Low socioeconomic/educational status
Overweight/obesity	Male sex
Physical inactivity/low fitness	Obstructive sleep apnea
Unhealthy diet	Psychosocial stress

7 Recommendations for the prevention of hypertension

7.1 Individual level and lifestyle interventions

Recommendations for lifestyle interventions for hypertension prevention[1]		
Class of recommendation	Level of evidence	Recommendation
I	A	Weight loss is recommended to prevent hypertension and reduce BP in adults with elevated BP or hypertension who are overweight or obese.[82–85]
I	A	Sodium reduction is recommended for adults to prevent hypertension and to lower BP in those with elevated BP or hypertension.[86–88]
I	A	Potassium supplementation, preferably in dietary modification, is recommended to prevent hypertension and to lower BP in adults with elevated BP or hypertension, unless contraindicated by the presence of CKD or use of drugs that reduce potassium excretion.[89,90]
I	A	The DASH (Dietary Approaches to Stop Hypertension) or a heart-healthy diet that helps achieving a desirable weight is recommended for adults to prevent hypertension and to lower BP in those with elevated BP or hypertension.[91–93]
I	A	Increased physical activity with a structured exercise program is recommended to prevent hypertension and reduce BP in adults with elevated BP or hypertension.[94–96]
I	A	To prevent hypertension and reduce BP in those with elevated BP or hypertension, adult men and women should not drink alcohol of more than 2 and 1 standard drinks per day, respectively.[97,98]

Lifestyle interventions are effective in lowering BP, with the most important interventions being weight loss,[82] the DASH (Dietary Approaches to Stop Hypertension) diet,[92] sodium reduction,[86] potassium supplementation,[90] increased physical activity,[95] and a reduction in alcohol consumption.[98] The dose and potential impact of the best proven lifestyle interventions for prevention of hypertension are summarized in Table 9. Various other nonpharmacological interventions have been reported to lower BP, but the extent and/or quality of the supporting clinical trial experience is less persuasive. Such interventions include consumption of probiotics;[99] increased intake of protein,[100] fiber,[101] flaxseed,[102] or fish oil;[103] supplementation with calcium[104] or magnesium;[105] and use of dietary patterns other than the DASH diet, including low-carbohydrate, vegetarian, and Mediterranean diets.[106,107] Stress reduction is intuitively attractive but insufficiently proved,[108] as are several other interventions, including consumption

of garlic,[109] dark chocolate,[110] tea,[111] or coffee.[112] Behavioural therapies, including guided breathing, yoga, transcendental meditation, and biofeedback, lack strong evidence for their long-term BP-lowering effect.[108,113,114] The lifestyle interventions presented in Table 9 may be sufficient to prevent hypertension and meet goal BP in managing patients with stage 1 hypertension, and they are an integral part of the management of persons with stage 2 hypertension.

Table 9 Dose and Potential Impact of the Best Proven Lifestyle Interventions for Prevention of Hypertension

Lifestyle intervention		Dose	Approximate Impact on SBP		Ref
			Hypertension	Normal BP	
Weight loss	Weight/body fat	Best goal is ideal body weight, but aim for at least a 1-kg reduction in body weight for most adults who are overweight. Expect about 1 mm Hg for every 1-kg reduction in body weight.	−5 mm Hg	−2/3 mm Hg	82
Healthy diet	DASH dietary pattern	Consume a diet rich in fruits, vegetables, whole grains, and low-fat dairy products, with reduced content of saturated and total fat.	−11 mm Hg	−3 mm Hg	91,115
Reduced intake of dietary sodium	Dietary sodium	Optimal goal is <1500 mg/d, but aim for at least a 1000-mg/d reduction in most adults.	−5/6 mm Hg	−2/3 mm Hg	86,87
Enhanced intake of dietary potassium	Dietary potassium	Aim for 3500–5000 mg/d, preferably by consumption of a diet rich in potassium.	−4/5 mm Hg	−2 mm Hg	89
Physical activity	Aerobic	90–150 min/wk 65%–75% heart rate reserve	−5/8 mm Hg	−2/4 mm Hg	95
	Dynamic resistance	90–150 min/wk 50%–80% 1 rep maximum 6 exercises, 3 sets/exercise, 10 repetitions/set	−4 mm Hg	−2 mm Hg	95
	Isometric resistance	4 × 2 min (hand grip), 1 min rest between exercises, 30%–40% maximum	−5 mm Hg	−4 mm Hg	116

		voluntary contraction, 3 sessions/wk 8–10 wk			
Alcohol intake	Alcohol consumption	In individuals who drink alcohol, reduce alcohol to: Men: ≤2 drinks daily Women: ≤1 drink daily	−4 mm Hg	−3 mm Hg	[98]

7.1.1 Bodyweight

Weight loss is a core recommendation and should be achieved through a combination of reduced calorie intake and increased physical activity.[82] The BP-lowering effect of weight loss in patients with elevated BP is consistent with the corresponding effect in patients with established hypertension, with an apparent dose–response relationship of about 1 mm Hg per kilogram of weight loss. Achievement and maintenance of weight loss through behavior change are challenging but feasible over prolonged periods of follow-up.[117,118] For those who do not meet their weight loss goals with nonpharmacological interventions, pharmacotherapy or minimally invasive and bariatric surgical procedures can be considered.[119] Surgical procedures tend to be more effective but are usually reserved for those with more severe and intractable obesity because of the frequency of complications.[120]

7.1.2 Diet

The DASH eating plan is the diet best demonstrated to be effective for lowering BP. Because the DASH diet is high in fruits, vegetables, and low-fat dairy products, it provides a means to enhance intake of potassium, calcium, magnesium, and fiber. In hypertensive and nonhypertensive adults, the DASH diet has produced overall reductions in SBP of approximately 11 mm Hg and 3 mm Hg, respectively.[91] When combined with weight loss or a reduction in sodium intake, the effect size was substantially increased.[92,115] Lifestyle change with the DASH diet has been successful in at least 2 trials that used a behavioral intervention over a 4-month[121] or 6-month[115] period of follow-up. Websites and books provide advice on implementation of the DASH diet.[122] Counseling by a knowledgeable nutritionist can be helpful. Several other diets, including diets that are low in calories from carbohydrates,[106] high-protein diets,[123] vegetarian diets,[107] and a Mediterranean dietary pattern,[124] have been shown to lower BP.

In observational studies, there is a strong, predictable direct relationship between alcohol consumption and BP especially above an intake of 3 standard drinks per day.[125] Meta-analyses of RCTs that have studied the effect of reduced alcohol consumption on BP in adults have identified a significant reduction in SBP and DBP.[98] The benefit has seemed to be consistent across trials, but confined to those consuming ≥3 drinks/day, as well as dose dependent, with those consuming ≥6 drinks/day at baseline who reduce their alcohol intake by about 50%, experiencing an average reduction in SBP/DBP of approximately 5.5/4.0 mm Hg.[98]

Sodium reduction interventions prevent hypertension and lower BP in adults with hypertension, especially in those with higher levels of BP, older persons, and others who are particularly susceptible to the effects of sodium on BP.[86,87] Lifestyle change (behavioral) interventions usually reduce sodium intake by about 25% (approximately 1000 mg per day) and result in an average of about a 2–mm Hg to 3–mm Hg reduction in SBP in non-hypertensive

individuals, though the reduction can be more than double this in more susceptible individuals, those with hypertension, and those concurrently on the DASH diet[92] or receiving a weight loss intervention.[88] Sodium reduction in adults with hypertension who are already being treated with BP lowering medications further reduces SBP by about 3 mm Hg and can facilitate discontinuation of medication, although this requires maintenance of the lifestyle change and warrants careful monitoring.[88] When combined with weight loss, the reduction in BP is almost doubled. Maintenance of the lifestyle changes necessary to reduce sodium intake is challenging,[83] but even a small decrement in sodium consumption is likely to be safe and beneficial, especially in those whose BP is salt sensitive.[126] Most dietary sodium comes from additions during food processing or during commercial food preparation at sit-down and fast-food restaurants.[127] Person-specific and policy approaches can be used to reduce dietary sodium intake.[126,128] Individuals can take action to reduce their dietary intake of sodium by choice of fresh foods, use of food labels to choose foods that are lower in sodium content, choice of foods with a "no added sodium" label, judicious use of condiments and sodium-infused foods, use of spices and low-sodium flavorings, careful ordering when eating out, control of food portion size, and avoiding or minimizing use of salt at the table. Dietary counseling by a nutritionist with expertise in behavior modification can be helpful. A reduction in the amount of sodium added during food processing, as well as fast food and restaurant food preparation, has the potential to substantially reduce sodium intake without the need for a conscious change in lifestyle.[128,129]

Dietary potassium is inversely related to BP and hypertension in cross-sectional reports,[55,59] and prospective cohort studies.[60] Potassium interventions have been effective in lowering BP.[126] The typical BP-lowering effect of a 60-mmol (1380-mg) administration of potassium chloride has been about 2 mm Hg and 4 to 5 mm Hg in adults with normotension and hypertension, respectively, although the response is up to twice as much in persons consuming a high-sodium diet. A reduction in the sodium/potassium index may be more important than the corresponding changes in either electrolyte alone.[62] Most of the intervention experience comes from trials of relatively short duration (median of 5 to 6 weeks),[130] but the BP-lowering effect of potassium in adult patients consuming a high sodium diet has been reproduced after an interval of 4.4 years.[131] In most trials, potassium supplementation was achieved by administration of potassium chloride pills, but the BP response pattern was similar when dietary modification was used.[89] Because potassium rich diets tend to be heart healthy, they are preferred over use of pills for potassium supplementation. The 2015 Dietary Guidelines for Americans encourage a diet rich in potassium and identify the adequate intake level for adult patients as 4700 mg/day.[132] The World Health Organization recommends a potassium intake of at least 90 mmol (3,510 mg) per day from food for adult patients.[133] Good sources of dietary potassium include fruits and vegetables, as well as low-fat dairy products, selected fish and meats, nuts, and soy products. Four to five servings of fruits and vegetables will usually provide 1,500 to >3,000 mg of potassium. This can be achieved by a diet, such as the DASH diet, that is high in potassium content.

7.1.3 Physical activity and exercise

A BP-lowering effect of increased physical activity has been repeatedly demonstrated in clinical trials, especially during dynamic aerobic exercise,[95] but also during dynamic resistance training[134] and static isometric exercise.[116] The average reductions in SBP with aerobic exercise are approximately 2 to 4 mm Hg and 5 to 8 mm Hg in adult patients with normotension and hypertension, respectively.[95] Most trials have been of relatively short duration, but increased physical activity has been an intrinsic component of longer-term weight reduction interventions used to reduce BP and prevent hypertension.[84] BP-lowering effects have been reported with lower- and higher-intensity exercise and with continuous and interval exercise training.[95,135] Meta-analyses suggest isometric exercise results in substantial lowering of BP.[116]

7.2 Policy interventions at the population level

Population level approaches to hypertension prevention centre around upstream measures requiring broad public-health interventions targeting lifestyle and promoting monitoring of BP. These measures are designed to address populations and are intended to shift the population attributable risk. This is based on a prevention paradox described by Geoffrey Rose in 1981.[136] The population attributable risk depends on the RR and on the prevalence of a risk factor in the general population. If the prevalence of a significant RR factor is low, then the population attributable risk may be modest. Conversely, if a low-impact RR factor is common, the population attributable risk may be high. This prevention approach following the Geoffrey Rose paradigm[136,137] states that small shifts in the risk of disease across a whole population consistently lead to greater reductions in disease burden than does a large shift in high-risk individuals only.[138,139] In other words, many people exposed to a small risk may generate more disease than a few exposed to a conspicuous risk. This population-wide approach—as opposed to strategies targeting high risk individuals—has major advantages at the population level whilst sometimes having only a modest benefit at the individual level, because it addresses the health of a large number of individuals over the entire life course. It should be noted that high-risk and population-level prevention strategies are not mutually exclusive and must therefore coexist.

Prevalence of high-risk conditions and incidence rates of hypertension vary across countries. Many of their underlying causes are known, and they are closely related to dietary habits, physical activity (PA), alcohol, employment, social deprivation, and the environment. The objective of population approaches to prevention of hypertension is to control the underlying determinants of BP and, in this way, reduce population incidence rates. The population approach may bring numerous benefits, such as narrowing the gap in health inequalities, preventing other conditions such as CVD, cancer, pulmonary diseases, and type 2 DM, and saving costs from the avoided hypertension cases and early retirement due to health problems.

Individual behaviour is enacted in an environment with hierarchical levels, which encompass individual choice, family influence, cultural grouping, workplace, healthcare, and policy at the regional, state, and global levels. The aim of this section of the guidelines is to provide evidence-based suggestions for the most effective interventions to reduce hypertension risk at the population level and promote healthy choices at the community, regional, and global level. Health challenges cannot be solved by the healthcare systems alone and require political

support. To advance this cause, the WHO has been organizing Global Conferences on Health promotion since 1990.

7.2.1 Specific risk factor interventions at the population level

Population-level interventions aim to alter the societal environment, modify certain social determinants of health, and provide incentives to encourage changes in individual behaviour and exposure to risk factors. Social determinants of health include socioeconomic status (education, occupation, and income), wealth inequalities, neighbourhood and urban design, and social networks, to name but a few. Healthcare professionals play an important role in advocating evidence-based population-level interventions. By modifying the general context, one can induce healthy decisions as a default in entire populations (all age groups and particularly vulnerable ones). The task for both national and local authorities is to create social environments that provide healthier defaults, taking health literacy into account.[140,141] The evidence presented here builds on recent comprehensive reviews and individual studies, noting that it is rarely feasible to use an RCT to evaluate population-level interventions (in contrast to individual-level interventions).[142,143] The importance of heart disease in women has become apparent and sex differences in CVD prevention have prompted sex-specific awareness campaigns with the aim of reducing sex disparities in research and clinical care. While interpreting this section, it is important to recognize that there are often vested interests, which may influence policy decisions on health promotion. Lifestyle changes at the population level take time, may be expensive, and need to be sustained over time. Furthermore, the benefits may be slow to manifest; however, they persist over the long term and improve health-related quality of life and well-being.

7.2.2 Physical activity

Policy suggestions for population-based approaches to physical activity[144]				
Type of suggestion	Level	Class of recommendation	Level of evidence	Actions
Methods	Governmental restrictions and mandates	I	C	Consideration of PA when planning new landscaping/building is recommended, including increasing cycling and pedestrian lanes and reduced speed trafficking.[145]
	Media and education	IIb	C	Sustained, focused media and educational campaigns, using multiple media modes (e.g. apps, poster, flyers, and signage) may be considered to promote PA.[142]

		IIa	C	Short-term community-based educational programs and wearable devices promoting healthy behaviors, such as walking, should be considered.[146–148]
	Labelling and information	IIa	B	Point-of-decision prompts should be considered to encourage the use of stairs.[148]
		IIa	C	Exercise prescription for health promotion by physicians, especially general practitioners, similar to drug prescription, should be considered.
	Economic incentives	IIa	C	Increased fuel taxes should be considered to increase active transport.[145,149]
		IIb	C	Tax-reduction incentives for individuals to purchase exercise equipment or health club/fitness membership may be considered.[145,149]
		IIb	C	Sustained individual financial incentives may be considered for increased activity/fitness or weight loss.[145,149]
		IIb	C	Tax-reduction incentives to employers to offer comprehensive corporate wellness programs with nutrition, PA, and tobacco cessation/prevention components may be considered.[145,149]
Settings	Schools	I	C	Increased availability and types of school playground spaces and equipment for exercise activity and sports are recommended.[145]
		IIa	B	Regular classroom PA breaks during academic lessons should be considered.[150,151]

		IIa	C	Increasing active commuting to school should be considered, e.g. walking school bus program with supervised (for safety) walking routes to and from school.[145,152]
		IIb	B	Increasing number and duration of PA classes, with revised PA curricula to implement moderate activity and trained teachers in exercise and sports may be considered.[151]
	Worksites	IIa	B	Comprehensive corporate wellness programs should be considered with nutrition and PA components, possibly with medical supervision and governance.[153,154]
		IIa	C	Structured corporate wellness programs that encourage PA also during work hours. Improving stairway access and appeal, potentially in combination with elevators that skip some floors, should be considered.[145,148]
		IIa	C	Promoting worksite fitness centers/gyms should be considered.
	Community setting	IIa	C	Healthcare providers should consider inquiring about PA in every medical evaluation and promoting it.
		IIa	C	Improving accessibility of recreation and PA spaces and facilities, and improved walkability, should be considered.
		IIa	C	Improved neighborhood aesthetics to increase activity in adults should be considered.

Physical inactivity is the fourth leading cause of death in the world, according to the World Health Organization (WHO). Nonetheless, sedentary lifestyle and physical inactivity affect a sizeable proportion of the population worldwide, and the level of adherence of the general population to recommended levels of physical activity (PA) remains unacceptably low,[155] although one-third of general population are aware that they lack adequate PA.[156] Alarmingly, indeed, only 10% of the general population meets the minimum recommended level of PA using objective assessments. Worldwide, 1 in 4 adults and 3 in 4 adolescents (aged 11-17 years) do not currently meet the global recommendations of PA set by WHO. The target of the new Global Action Plan on Physical Activity 2018 - 2030 is a 15% relative reduction in the global prevalence of physical inactivity in adults and adolescents.[157] Various reasons may explain this habit: perceived limitations in PA and effort; lack of time, fun, and motivation; economic problems; misconceptions of the minimal volume of PA necessary for cardiovascular health benefits; and unfavourable environments (lack of sports facilities, lack of walking or cycling lanes, etc.).[158] Considering these difficulties, more attention has been paid recently to sedentary behaviour (more than physical inactivity), which has been defined as an energy expenditure <_1.5 metabolic equivalents (METs), while in seated, reclined, or lying posture for several hours a day.[159] A recent American Heart Association report highly encouraged further research that would inform on future quantitative public health guidelines and novel strategies that can influence legislative initiatives.[160] For instance, 'active cities' could be achieved by creating new architectural models with bicycle lanes and walking paths or by encouraging the use of stairs.[161] Focused media and educational campaigns can also initiate PA in the general population and in patients with diseases such as cancers,[162] cardiac diseases, and type 2 diabetes mellitus. Recent campaigns from sports medicine societies have endorsed PA prescriptions from general practitioners, as do the recent European Society of Cardiology (ESC) Guidelines on sports cardiology.[163]

Adults should engage in 150 min per week of accumulated moderate-intensity PA or 75 min per week of vigorous-intensity PA. For additional benefits in healthy adults, a gradual increase of aerobic activity to 300 min a week of moderate intensity, or 150 min a week of vigorous intensity aerobic activity, or an equivalent should be considered. Recommendations for physical exercise and exercise training in the management of cardiovascular health in individuals with cardiovascular risk factors were published several years ago but are obviously not followed.[164]

Schools are considered ideal settings for the promotion of children's PA, which should be started in kindergarten and continued throughout primary and secondary education.[161] Multiple physical and mental health benefits are obtained when children participate in 60 min per day of moderate to-vigorous PA.[151] A review of 11 studies concluded that PA lessons may have a positive effect on PA improvement, without having an effect on learning or academic-related outcomes.[150] Despite these benefits, population-based studies have reported that over 50% of children are not meeting these recommendations.[152,165] An international study on health literacy among European citizens has shown that 47% of Europeans lack health literacy.[140] Furthermore, it appears that participation in PA is associated with health literacy and that those who lack this are less engaged in PA.[166]

Worksites can offer many opportunities for PA promotion.[153] Some larger companies offer a corporate wellness programme and/ or a fitness centre without fees for employees, with varying results.[154,161] Adherence of the company population to these initiatives remains generally low, with great difficulty in involving inactive individuals (although a 'drag effect' has been documented recently from the most active individuals to the sedentary).[167,168]

Wearable PA monitoring devices and mobile phone applications are thought to increase PA and help maintain the healthy benefits gained life-long.[146] A systematic review[147] and an RCT[169] showed that wearables with PA prescription significantly improved cardiorespiratory fitness in the cardiac population to a greater extent than without devices.

Improved accessibility to recreation and exercise facilities with increasing operating hours may increase regular PA in all age groups and reduce socioeconomic inequality of access.[170] Finally, an increase in fuel prices may reduce car driving and increase active commuting (with improved safety and public transportation) for those who live within a reasonable walking or cycling distance, with the exception of people with limiting diseases or disabilities.[142]

7.2.3 Diet

Policy suggestions for population-based approaches to diet[144]				
Type of suggestion	Level	Class of recommendation	Level of evidence	Actions
Methods	Governmental restrictions and mandates	I	B	Legislation on the composition of foods and beverages to reduce energy density, salt and saturated fat, and (added) sugar content, and to limit portion sizes, is recommended.[143,171]
		I	A	Implementation of the regulation on the upper limit of industrially produced trans fats, or their ban, is recommended.[143]
		I	C	Facilitating an integrated and coherent policy and activities of (local) governments, non-governmental organizations, the food industry, retail, catering, schools, workplaces, and other stakeholders to promote a healthy diet and prevent overweight is recommended.[172,173]

		I	C	Legislation restricting marketing aimed at children of foods that are high in fats, sugar and/or salt, less healthy options, junk foods, beverages rich in sugar (e.g. on television, the internet, social media, and on food packages) is recommended.[143,174,175]
	Media and education	IIa	C	Reformulation of foods, accompanied by educational information campaigns, should be considered to create awareness among consumers on the nutrition quality of foods.[176]
	Labelling and information	I	C	Mandatory and harmonized front-of-pack nutrition labelling is recommended.[142]
		IIa	C	Mandatory nutrition labelling for non-prepackaged foods, including in restaurants, hospitals, and workplaces, should be considered.
	Economic incentives	I	B	Pricing and subsidy strategies are recommended to promote healthier food and beverage choices.[143,177–179]
		I	B	Taxes on foods and beverages rich in sugar and saturated fat are recommended.[177,180]
Settings	Schools	I	B	At all schools, preschools, and day-care centers, a multicomponent, comprehensive, and coherent policy is recommended to promote a healthy diet.[173,175]
		I	B	Availability of fresh drinking water and healthy foods in schools, and in vending machines, is recommended.[173,175]

	Worksites	I	B	At all companies, a coherent and comprehensive health policy and nutritional education are recommended to stimulate the health awareness of employees.[142,181]
		IIa	C	Increased availability of fresh drinking water and improved nutritional quality of food served and/or sold in the workplace, and in vending machines, should be considered.
	Community setting	IIa	C	Regulation of the location and density of fast food and alcohol purchasing outlets and other catering establishments should be considered.

Diet is a powerful determinant of obesity, hypertension, dyslipidaemia, and diabetes. Important reductions in cardiovascular events can be seen after changes in diet at the population level.[182] Stakeholders, including healthcare professionals, have a shared responsibility for population-based approaches and can help to promote healthy diets and environments.[143] On a general note, educational campaigns seem to be more efficient for the higher educated and health literate, whereas taxation and reformulation are measures that tend to work best for less educated groups.

Health benefits include reducing the energy density and salt and refined sugar content in foods and drinks, as well as the replacement of trans fats by unsaturated fat.[142,143] These changes have led to successful reductions in trans fats and salt, the latter likely leading to decreases in blood pressure.

Governments can facilitate nationwide cooperation between (local) governments, non-governmental organizations, the food industry, retail, catering, schools, workplaces, and other stakeholders.[173] Governments also can intervene in the media (e.g. limiting children's exposure to advertising of unhealthy foods) and regulate digital marketing. A nationwide cooperation including, among other partners, the food industry is recommended with consideration of vested interests of corporations.

Consumer-awareness campaigns on healthy foods as well as nutrition labelling and calories on meals in restaurants and fast-food outlets can be effective in making healthy choices, and have a positive effect on sales and stimulate the reformulation of foods.[175,176]

Pricing strategies above a certain threshold can lead to a decline in the sales of unhealthy foods and an increase in the sales of fruits and vegetables.[178,179] Modelling studies have demonstrated that food taxes could improve energy and nutrient intake, body mass index, and health.[143,177] An increasing number of countries have introduced taxes on unhealthy foods and drinks.[175] As healthy diet recommendations tend to be more expensive, subsidizing the costs of healthier food might also be considered and have an impact on individuals' choice. Studies on health and cost impacts of various food taxes and subsidies are scarce, but in a modelling study, tax on sugar and fruit and vegetable subsidies produced the greatest health gain span.[183]

Every school and workplace should have a policy to promote a healthy environment and provide healthy foods and meals.[143,173,181] Education on healthy lifestyle must be a part of the school curriculum. In the community, planning the location and density of fast-food outlets and providing good access to supermarkets is needed, especially in deprived areas.[142,143] Comprehensive strategies involving multiple components are most successful.[179]

At the governmental level, agricultural policies aimed at providing safe, healthy, and sustainable foods, and favouring national food security (i.e. aiming at self-sufficiency regarding food production) should be promoted. Furthermore, there is a need of national food consumption and health surveys to monitor lifestyles and risk factor profiles at the population level; these should be organized at regular intervals and harmonized.

8 Improving adherence

Nonadherence (not following recommended medical or health advice, including failure to "persist" with recommended lifestyle modifications or medications) is a major contributor to poor control of hypertension and a key barrier to reducing CVD deaths. Adherence rates vary substantially in different populations and, in general, are lower for lifestyle change and more behaviorally demanding regimens.

8.1 Strategies to Promote Lifestyle Modification

Recommendations for strategies to promote lifestyle modification		
Class of recommendation	Level of evidence	Recommendation
I	C	Effective behavioral and motivational strategies to achieve a healthy lifestyle (i.e., weight loss, increased physical activity, reduced sodium intake, consumption of a healthy diet, tobacco cessation, and limit alcohol intake) are recommended for adults to prevent and control hypertension.[184,185]

The primary lifestyle modification interventions that can help reduce high BP are outlined in Section 7 (healthy diet, weight loss, exercise and limiting sodium intake). In addition, tobacco cessation is crucial for CVD risk reduction. These modifications are central to good health and require specific motivational and cognitive intervention strategies designed to promote adherence to these healthy behaviours. High-quality evidence supporting some of these strategies is provided in Table 10. Additionally, interventions such as goal setting, provision of feedback, self-monitoring, follow-up, motivational interviewing, and promotion of self-sufficiency are most effective when combined. Most individuals have clear expectations about what a new lifestyle will provide; if their experiences do not match these expectations, they will be dissatisfied and less motivated to maintain a lifestyle change, particularly in environments that do not support healthy choices. Other factors that may influence adoption and maintenance of new physical activity or dietary behaviours include age, sex, baseline health status, and body mass index, as well as the presence of comorbid conditions and depression, which negatively affect adherence to most lifestyle change regimens.[184] Primary strategies include cognitive-behavioural strategies for promoting behaviour change, intervention processes and delivery strategies, and addressing cultural and social context variables that influence behavioural change.

It is crucial to translate and implement into practice the most effective evidence-based strategies for adherence to nonpharmacological treatment for hypertension. Both adoption and maintenance of new CVD risk-reducing behaviours pose challenges for many individuals. Success requires consideration of socioeconomic status, as well as individual, provider, and environmental factors that may influence the design of such interventions.[184] High-quality

evidence has shown that even modest sustained lifestyle changes can substantially reduce CVD morbidity and mortality.[184] Because many beneficial effects of lifestyle changes accrue over time, long-term adherence maximizes individual and population benefits. Interventions targeting sodium restriction, other dietary patterns, weight reduction, and new physical activity habits often result in impressive rates of initial behaviour changes but frequently are not translated into long-term behavioural maintenance.

Table 10 Examples of Strategies to Promote Lifestyle Modification Interventions in Patients with Hypertension

	Lifestyle Modification Intervention	References
Weight Loss	Offer or refer obese adults to intensive cognitive and behavioural interventions aimed at to improve weight status and other risk factors for important health outcomes.	186
Sodium Reduction	Offer or refer to behavioural counselling aimed at reduced intake of dietary sodium. Encourage use of food labels to choose lower sodium products	184
Physical Activity and Diet	Use medium- to high-intensity behavioural counselling interventions to improve intermediate health outcomes; addressing barriers, such as lack of access to affordable healthier foods, transportation barriers and poor local safety.	187
Alcohol	Screen adults ≥18 y of age for alcohol misuse and provide persons engaged in risky or hazardous drinking with behavioural counselling interventions to reduce alcohol misuse.	188

8.2 Antihypertensive Medication Adherence Strategies

Recommendations for antihypertensive medication adherence strategies		
Class of recommendation	Level of evidence	Recommendation
I	B	In adults with hypertension, dosing of antihypertensive medication once daily rather than multiple times daily is beneficial to improve adherence.[189,190]
IIa	B	Use of combination pills rather than free individual components can be useful to improve adherence to antihypertensive therapy.[191,192]

Up to 25% of patients do not fill their initial prescription for antihypertensive therapy.[193] During the first year of treatment, the average patient has possession of antihypertensive medications only 50% of the time, and only 1 in 5 patients has sufficiently high adherence to achieve the benefits observed in clinical trials.[194] Factors contributing to poor adherence are

myriad, complex, and multilevel.[194,195] Therefore, solutions to improve adherence may be introduced at patient, provider, and healthcare system levels.[196,197] Several systematic reviews and meta-analyses have assessed the impact of interventions on adherence to antihypertensive medications, including modification of antihypertensive therapy.[189,196,198] No single intervention is uniquely effective, and a sustained, coordinated effort that targets all barriers to adherence in an individual is likely to be the most effective approach. Table 11 for barriers to medication adherence and the most successful interventions.

Table 11 Barriers and Improvement Strategies in Antihypertensive Medication Adherence

Barriers	Improvement Strategies
Patient Level	

• Multiple comorbid conditions requiring complex medication regimens
• Convenience factors (e.g., dosing frequency)
• Health beliefs
• Behavioural factors
• Lack of involvement in the treatment decision–making process
• Issues with treatment of asymptomatic diseases (e.g., treatment side effects)
• Resource constraints
• Suboptimal health literacy
	• Educate patients about hypertension, consequences of hypertension, and possible adverse effects of medications
	• Collaborate with patient to establish goals of therapy and plan of care. Family social support maybe beneficial.[199]
	• Maintain contact with patients; consider telehealth approaches[200]
	• Integrate pill-taking into daily routine activities of daily living with adherence support tools such as reminders, pillboxes, packaging, or other aids
	• Use motivation interventions to support medication adherence and lifestyle modification efforts
	• Use medication adherence scales to facilitate identification of barriers and facilitators to and behaviours associated with adequate adherence
	• Address health literacy
	  ○ Teach-back method
	  ○ Empower patients to ask questions
	  ○ Use visual, interactive education
	  ○ Health literacy universal precautions tool kit
	  ○ Provide medication list/pictorial medication schedule

Provider and Health System Levels	
• Prescription of complex drug regimens • Inadequate communication with patient about regimen, adverse effects, treatment goals	• Assess for nonadherence and explore barriers to medication adherence • Use a multifactorial approach to optimize adherence • Participate in training to enhance communication skills and increase cultural competence • Use a multifactorial approach to optimize adherence • Reduce complexity of medication regimen

• Inadequate communication among multiple providers • Office visit time limitations • Limited access to care, pharmacies, prescription refills	• Utilize agents that are dosed once daily over those which require multiple daily doses • Utilize fixed-dose combination agents when available and simplify drug regimens • Consider overall side effect profile and preferentially use agents that are well tolerated • Use low-cost and generic antihypertensives from drug classes where RCTs have demonstrated a reduction in cardiovascular events when appropriate[201] • Use team-based care approaches • Use health information technology-based approaches

The creation of an encouraging, blame-free environment in which patients are recognized for achieving treatment goals and given "permission" to answer questions related to their treatment honestly is essential to identify and address nonadherence. Patient medication adherence assessment tools[202] are presented in Table 12. Members of the hypertension care team may use these self-report tools in a nonthreatening fashion to identify barriers and facilitate behaviours associated with improved adherence to antihypertensive medications. Use of more objective methods (e.g., pill counts, data on medication refills) to assess adherence along with self-report methods is optimal.

Table 12 Medication Adherence Assessment Scales (Hill-Bone Compliance Scale)

How often do you:	Response:
1. Forget to take your high BP medicine? 2. Decide NOT to take your high BP medicine? 3. Eat salty foods 4. Shake salt on your food before you eat it? 5. Eat fast food? 6. Make the next appointment before you leave the doctor's office? 7. Miss scheduled appointments? 8. Forget to get prescriptions filled? 9. Run out of high BP pills? 10. Skip your high BP medicine before you go to the doctor? 11. Miss taking your high BP pills when you feel better? 12. Miss taking your high BP pills when you feel sick? 13. Take someone else's high BP pills? 14. Miss taking your high BP pills when you are careless?	1. All of the Time 2. Most of the Time 3. Some of the Time 4. None of the Time **Subscales** Medication taking subscale: Items 1,2,8,9,10,11,12,13,14 Reducing sodium intake subscale: Items 3,4,5 Appointment keeping subscale: Items 6,7

Remembering to take medication is often challenging, particularly for regimens that must be dosed several times daily. Taking medications several times throughout the day requires greater attention to scheduling, as well as additional issues such as transportation or storage, which can be challenging for some patients. The impact of once-daily dosing of antihypertensive drugs versus dosing multiple times daily has been evaluated in several meta-analyses.[189,203] Medication adherence was greatest with once-daily dosing (range 71% to 94%) and declined as dosing frequency increased.[189,203]

Assessment and possible modification of drug therapy regimens can improve suboptimal adherence. Simplifying medication regimens, either by less frequent dosing (i.e., once daily versus multiple times daily) or use of combination drug therapy, improves adherence.

9 Limitations and future directions

This guideline document covered significant literature summarizing critical topics related to prevention of high blood pressure in the general population. However, there are areas where evidence deemed limited specially among the Saudi population. Most of the evidence in this document was derived from literature where Western or South Asian populations where the primary study subjects. Therefore, the assumption that similar estimates or relationships existing in cohorts of Saudi Arabia may not be valid and requires further research.

Research into current procedures of measuring blood pressure in the office should be implemented with the objective of standardizing the measurement and the associated care and thus improving outcomes. Additionally, research into cost-effectiveness of mass or high-risk approach screening of hypertension in Saudi Arabia is warranted. This may raise attention to the importance of population-based probability samples that will help draw invaluable conclusions on estimates of morbidly and enable studying potential population impacts of CVD risk factors and the calculation of attributable risk estimates.

Additional research aimed at development of practical approaches to the implementation of clinical and population-based strategies to prevent obesity, increase physical fitness, and control excess salt and sugar intake could have significant public health impact. Exciting areas of research include incorporating eHealth and telehealth into research. For example, teleHealth and incorporating data from different inlets including census and other government data to prevent or control hypertension can be achieved but requires oversight from data privacy agents.

Unfortunately, the limited literature among populations in Saudi Arabia also extends to policy interventions that target CVD risk factors. It is suggested that considerable amount of funding should be directed towards testing the recommended interventions on different populations (age groups, working environments, etc.) in Saudi Arabia. Access to healthy food and affordability are also research areas that requires large scale involvement of multiple sectors and hopefully can target large section of the population. Research into factors and enablers of adherence to lifestyle interventions including diet, physical activity, and maintaining a long-term healthy weight is of paramount importance. This is true because prevention of hypertension in the general population is a lengthy process that requires long exposures to healthy behaviors before these can be translated into improved overall health of the population.

10 Counselling

Counseling is a systematic process which gives individuals an opportunity to explore and clarify the ways of living more resourcefully, with a greater sense of well-being. The counselor's role is to facilitate the client work in a way that respect the client's values, personal resources and capacity for self-determination. **The following skills are necessary for counseling:**

Attending Behavior

Involves our behaviors which include paying full attention, in an acceptable and supportive way, to the client. An attempt to build a certain amount of rapport with their client but not to an extent that would allow them to become emotionally involved.

Communication Skills

- Active listening is the most fundamental component of interpersonal communication skills, actively showing verbal and non-verbal signs of listening.
- Effective questioning skills (open-ended questions).
- Clarification: use of open questions to ensure the correct message has been received and to enable expanding on certain points as necessary.
- Paraphrasing (the counsellor uses different words to restate in a non-judgmental way what the client has said. Aiming to help the client to know that the counsellor is aware of the client's perspective and has heard what he or she has said.
- Reflective responses (responds to feelings). Affective reflection in an open-ended, respectful manner of what the client is communicating verbally and nonverbally, both directly through words and nonverbal behaviours as well as reasonable inferences about what the client might be experiencing emotionally.
- It is important for the helper to think carefully about which words he/she chooses to communicate these feelings back to the client.
- Empathetic response: Placing self in the client's situation while remaining objective. Empathizing requires the counsellor not to be judgmental and to be sensitive and understanding.
- Negotiation skills (a process by which compromise, or agreement is reached while avoiding argument).
- Structuring and Summarizing: repeating a summary of what has been said back to client in their word.

Advice Skills

The ability to give advice in a positive, constructive way is an art. Here are three points to help us offer advice with effectiveness and compassion.

Listen first While this rule is true for all good communication, it is doubly true when we wish to give advice. By first listening, we open a space for the speaker to more fully describe the situation and for us to more fully understand it. In addition, when we listen first, it makes it more likely that the other will then listen to what we have to say.

Ask permission It can be experienced as un-welcome intrusion into personal business. It might also be seen disrespectful, as implying that a person is incapable of caring for himself and resolving his own issues. Asking if our advice is desired shows respect for others and prevents resentments.

Offer without insisting It is worth keeping in mind that even after we have listened, we can never know with certainty what is best for another person. By not insisting, we can increase the chances of our words being considered.

STEPS	SKILLS	SCORING				
		1	2	3	4	5
Exploration of the problem	Establish good relationship: Welcome the client greets him, introduce yourself					
	Call by name or the name he likes, marital status, job					
	Use helpful non-verbal communication Suitable position posture and proper eye contact....					
	Show welcoming and willing to help					
	Attending behavior show interest, give attention, active listening					
	Be sensitive to verbal and non-verbal cues					
	Show empathy					
Enable the client to explore the problem from his own Idea, Concern, Expectation and Effect (ICEE)	Open ended questions,					
	Use paraphrasing,					
	Reflecting feelings					
	Help the client to be specific					
	Summarizing					
	Acceptance & non-judgmental attitude					
Understanding & defining goals	Help the client to recognize behavior pattern, inconsistency and feeling					
	Appropriate sharing of the knowledge, experiences and feeling					
	Reach a new understanding of the problems, See the problem in a new perspective					
	Focus on what to be done to enable the client to cope more effectively					
	Define goals					
Action	Use creative thinking, problem solving and decision making					
	Help the client to consider the action, consider its cost and consequences plan for it, implement it and evaluate it.					

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