



Hypertension and Lifestyle Modifications: Beyond Controversy

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Traditional approaches to controlling the epidemic of blood pressure-related atherosclerotic cardiovascular disease (ASCVD) in people with hypertension have mostly focused on pharmacological therapy. Nonetheless, nonpharmacologic therapy, commonly known as lifestyle modification, plays an essential and rising role in addition to medication therapy. Specifically, non-pharmacologic therapies can serve as initial therapy in Stage 1 hypertensive patients, facilitate medication step down or withdrawal in patients with well-controlled hypertension, prevent hypertension in high-risk populations, and reduce blood pressure in normotensive individuals and thereby lower their risk of ASCVD.

It particularly refers to life-style modifications i.e. therapeutic lifestyle changes (TLC) which include reducing dietary sodium, exercise for at least 30 min per day, five days per week; to have Dietary Approach to stop Hypertension (DASH) diet protocol and to achieve a weight loss goal of 4.5 kg or more by non-pharmacological measures such as increased physical activity, reduced salt intake, reduced fat intake, alcohol abstinence, smoking cessation, behavioural changes, yoga, meditation etc.

In fact, when we talk about controlling of hypertension, lifestyle modifications is always the first step of foremost importance.

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1. INTRODUCTION

“Non-pharmacologic approaches have enormous potential as a means to reduce blood pressure and control hypertension, thereby preventing the occurrence of ASCVD. The current challenge to health care providers, government officials, and the general public is to develop and implement effective clinical and public health strategies that lead to desirable lifestyle modifications”[1].

“High blood pressure is an independent risk factor for cardiac as well as cerebro-vascular diseases. At the cut off of 140/90 mmHg, 28 to 44% of the world population has hypertension, with ethnic variations. The lifetime risk of developing hypertension is estimated to be 90%. Indeed, blood pressure is a continued process and any increase above optimal levels, confer additional independent risk of coronary heart disease, stroke, congestive heart failure, end-stage renal disease, peripheral vascular disease and others” [2].

“All over the globe, hypertension is poorly controlled. About one third of patients have achieved the National High Blood Pressure Education Programme goal of 140/90 mmHg or lower. The mainstay of hypertension is pharmacotherapy. However, the non-pharmacological aspects are important, but often overlooked. Although, some lifestyle modifications may seem to have only minimal blood pressure lowering effect, these should not be discounted, but rather should be given top priority” [3].

“A reduction of systolic blood pressure of 5 mmHg has been associated with 14% reduction in mortality caused by stroke, 9% in mortality caused by heart disease and 7% in all cause mortality. In addition, a weight loss 4.5 kg, a realistic goal for most individuals who are overweight, can reduce or prevent hypertension” [4]. “Multiple mechanisms appear to contribute to BP reduction by dietary intervention (reduced weight and sodium, alcohol abstinence and increased calcium, potassium and magnesium)” [5,6]. “For exercise, these include improvements in arterial endothelial function and compliance, left ventricular structure as well as function and perhaps vascular blood supply with increased cardiorespiratory endurance. The available evidence is excessively in support of TLC (therapeutic lifestyle changes) for management

of elevated BP and for the primary prevention of hypertension” [7].

“While antihypertensive agents have been used, it is imperative that reduction of blood pressure to optimal levels and prevention of age-related increase in BP be pursued actively. There has been increasing emphasis on the prevention and treatment of hypertension by non-pharmacological means, termed lifestyle modifications. Lifestyle modifications that effectively lower BP are reduced sodium intake, increased physical activity, weight loss, smoking cessation, alcohol abstinence in alcoholics and the Dietary Approaches to Stop Hypertension (DASH) diet eating plan” [8-10].

2. STRONGLY RECOMMENDED LIFESTYLE MODIFICATIONS

2.1 Sodium Reduction

There is a strong & consistent evidence that reducing sodium intake reduces blood pressure. Dietary salt (sodium chloride) intake has a linear association with blood pressure. Reduced sodium intake to approximately 2 gm/day can prevent hypertension, can facilitate blood pressure control in elderly patients on medication and can potentially prevent cardiovascular events in overweight individuals.

In a Trial of Non-pharmacologic intervention in the Elderly (TONE) study, patients were randomized to a low sodium diet (5 gm of sodium chloride or 2 gm of sodium), a usual care (i.e. no study related counselling in lifestyle change). The intervention group had a 2.8 mmHg more reduction in systolic blood pressure than the control group. A study done later on, assessed the impact on blood pressure of three levels of daily sodium intake i.e. 3.6, 2.0 and 1.2 gm per day, representing a typical American diet. Results demonstrated a graded blood pressure response, with a correlation between greater reduction in blood pressure with lower sodium consumption. The message is as follows :

- Reduce salt intake to (5 gm of sodium chloride or 2.0 gm of sodium/day).
- Reduce amount of salt in food preparations.
- Avoid foods having high salt content.

Some foods with a high sodium content

- Potato chips, salted crackers/biscuits
- Fast foods, tomato juice (canned)
- Commercially prepared soups and stews
- Pastries or cakes, processed cheese

It should be noted that in the elderly (and in Black patients), sodium restriction may be more effective than in Whites and young people.

A lower sodium level of 1,500 mg a day or less is appropriate for people 51 years of age or older and individuals of any age, who have high blood pressure, diabetes or chronic kidney disease. Tips for decreasing sodium in diet :

- **Trace how much salt is to be in daily diet** : To keep a food diary to estimate how much sodium is in food and drinks on daily basis.
- **To read food labels** : To choose low-sodium alternatives of the foods and beverages purchased daily.
- **To eat fewer processed foods** : To avoid potato chips, frozen dinners and processed lunch.
- **To avoid extra salt** : To add spices, rather than salt, to add more flavour to your foods.
- **To go slow** : If it is not possible to reduce the sodium drastically, it may be done gradually.

3. EXERCISE/INCREASED PHYSICAL ACTIVITY

Aerobic exercise has positive effects on blood pressure, whether or not a person has hypertension. It reduces, on an average, systolic blood pressure by 4.0 mmHg and diastolic blood pressure by 3.0 mmHg. Additional benefits of aerobic exercise are increased insulin sensitivity and increasing high density lipoprotein cholesterol (HDL) level.

Since low-calorie diets are challenging, one must also increase energy expenditure with aerobic exercise to have a decent chance for successful weight reduction, which will help in achieving the goal blood pressure. Physicians should help patients find an activity that they enjoy, because enjoyment will increase their adherence. Patients may listen to music while walking, which may help to maintain interest level. If one has pre-hypertension (systolic blood

pressure between 120 and 139, diastolic BP between 80 and 89), exercise can help avoid developing full blown hypertension. Regular physical exercise can bring blood pressure down to safer levels.

Avoid being a 'Weekend Warrior'. It is not a good strategy to limit all exercise on the weekends to make up for weekday inactivity. Those sudden bursts of activity could actually be harmful.

Recommendation : Brisk walking for 30 minutes per day, ideally on most days of the week but at least on five days per week. Most health benefits occur with at least 150 minutes per week of moderate-intensity physical activity, such as brisk walking. Some physical activity is better than none, and more activity results in greater benefits. Health benefits of exercise include reduced rates of all-cause mortality, coronary heart disease, hypertension, stroke, type 2 diabetes, metabolic syndrome, colon cancer, breast cancer and depression.

A programme can be structured, so that someone could burn upto 200 extra calories or more a day, over and above the basic calories used for sedentary living etc.

4. WEIGHT LOSS

Weight loss is an important lifestyle modification in reducing blood pressure. A reduction of 5 kg can help reduce blood pressure or prevent hypertension. A reduction of 10 kg may produce a reduction in systolic blood pressure of 5 to 20 mmHg. Weight reduction is more effective than a low salt diet in young adults. However, in middle aged and elderly subjects, there is a significant additive effect of weight reduction and salt restriction on lowering blood pressure.

Besides shedding kilos, one should also keep an eye on one's waistline. Carrying too much weight around the waist, one can have greater risk of high blood pressure, in general.

- Men are at risk, if their waist measurement is greater than 102 cm (40 inches).
- Women are at risk, if their waist circumference is greater than 88 cm (35 inches).
- Asian men are at risk, if their waist measurement is greater than 90 cm.
- Asian women are at risk, if their waist measurement is greater than 80 cm.

5. ALCOHOL CONSUMPTION

In view of bad effects of alcohol as well as because of availability of other health benefit programmes, alcohol consumption is not recommended at all for non-drinkers or drinkers.

As part of a comprehensive lifestyle program, alcohol consumption should be limited to two drinks per day (about 1 oz or 30 ml of ethenol) for most men and 1 drink per day women and lighter weight men. If somebody does not normally drink alcohol, the physician should not advocate drinking, as a way to lower blood pressure. There are more potential harms than any benefit to drinking alcohol. Drinking more than the suggested amounts should be cut back.

6. DIETARY MODIFICATION AND SUPPLEMENTATION

The Dietary Approaches to Stop Hypertension (DASH) Eating Plan study showed that an even lower intake of sodium further reduces BP in both normotensives and hypertensives. However, palatability concerns are important and the fact should be kept in mind that other nutrients intake would suffer, whilst trying to stick to such an intensive regimen (5 gm of salt/day).

The DASH eating plan outlines a diet rich in fruits and vegetables, high in low fat dairy products, potassium, magnesium as well as calcium and low in saturated fats. This can produce a mean reduction of 6 mmHg in systolic blood pressure and 3 mmHg in diastolic blood pressure.

Premier Trial: In this trial, the impact of comprehensive lifestyle changes on blood pressure was assessed. Participants in the lifestyle changes had a greater reduction in blood pressure than those in the usual care group and this was further enhanced with addition of the DASH eating plan.

“Garlic is commonly used as a dietary supplement to lower blood pressure. Data from two randomized controlled trials comparing the use of garlic vs. placebo in patients with hypertension showed that garlic may have some blood pressure-lowering effect. However, compared with dietary changes, reduced sodium intake, and physical activity, there is insufficient evidence to support the use of garlic in reducing morbidity or mortality associated with cardiovascular events” [7].

“Cocoa has a small but statistically significant blood pressure-lowering effect (average of 2 to 3 mm Hg) in adults with hypertension, but there is no evidence that it improves patient-oriented outcomes in the long term.

Although vitamin C, coenzyme Q10, omega-3 fatty acids, and magnesium have been used for lowering blood pressure, there is no evidence to support their use in the management of hypertension due to lack of data on well-designed randomized controlled trials” [7].

7. SODIUM, POTASSIUM & BLOOD PRESSURE

Sodium (Na) and potassium (K) fluctuate antagonistically. A decrease in potassium leads to sodium retention, whereas an increase in potassium leads to sodium excretion, thereby promoting diuresis and natriuresis.

In persons with essential hypertension, a diet low in potassium results in a systolic increase of 7 mmHg because of increased sodium retention. Increased potassium resulted in a reduction of 2.42 mmHg in systolic blood pressure and a drop of 1.57 mmHg in diastolic blood pressure. However, current recommendations are to obtain adequate potassium intake through a healthy diet.

8. SMOKING CESSATION

Cigarette smoking causes 4 mmHg increase in systolic blood pressure and 3 mmHg increase in diastolic blood pressure. Compared with placebo, nicotine released during cigarette smoking increases sympathetic nervous activity which in turn increases myocardial oxygen demand through increased blood pressure, heart rate and myocardial contractility.

Hypertensive patients, those who smoke have increased risk of total, ischemic as well as hemorrhagic stroke and this rise is related to the number of cigarettes smoked. Smoking cessation should be part of any comprehensive lifestyle modification plan to reduce the risk of high blood pressure and cardiovascular disease.

9. YOGA, MEDITATION AND OTHER RELAXATION TENHNIQUES

“Yoga and meditation include a variety of techniques, such as repetition of a word or phrase (mantra) and careful attention to the

process of breathing, to achieve a state of inner calm, detachment and focus. Transcendental meditation may even reduce blood pressure modestly and also reduces mortality in patients with hypertension. Meditation may have other benefits and does not appear to be harmful, except in patients with psychosis. Biofeedback techniques have been proven effective and may be considered in clinical practice to lower blood pressure” [7].

“The mechanism by which relaxation techniques lower blood pressure is unclear. One theory suggests that they may help lower the stress and physiologic arousal produced by the autonomic nervous system, thereby reducing blood pressure” [7].

10. CLINICAL FOCUS

- Lifestyle modifications have definite role in all categories of hypertension and is especially advised in pre-hypertensive stage.
- Lifestyle modifications should be the first-line of therapeutic approach in all patients with mild hypertension.
- Regular exercise, sodium restriction, weight loss measures etc. should be strictly adhered to by hypertensives to maintain a better quality of life.
- Therapeutic lifestyle modifications minimize the cost of pharmacological intervention and the untoward effects of various drugs.
- Daily exercise, as per recommendation, is always better than weekend vigorous exercise, which may actually be harmful.
- Dietary modification, as per DASH protocol, is ideal and may be gradually attained.
- Alcohol can never be recommended and should not be initiated in non-drinkers.
- Meditation helps in achieving the goal BP and at the same time helps in having physical and mental well-being.
- Pharmacological intervention in a timely fashion is desirable in all patients having BP, who are not optimally controlled with therapeutic lifestyle modifications.

11. CONCLUSION

Non-pharmacologic measures should be part of routine management of hypertension. It is emphasized that simple advice from physicians

can have positive influence on patient's motivation to make positive lifestyle changes.

Lifestyle recommendations' should not be given as lip service but instituted with adequate behavioural and expert support and reinforced periodically. Because long-term compliance with lifestyle measures is low and the BP response highly variable, patients undergoing non-pharmacological treatment should be followed up closely to start drug treatment when needed and in a timely fashion.

Non-pharmacologic approaches to reduce BP have enormous potential as a means for preventing hypertension and controlling BP, thereby reducing the occurrence of ASCVD. Now, the greatest challenge is developing and implementing strategies that lead to a reduced salt intake, reduced weight, increased physical activity, moderate alcohol intake among those who drink, and an overall healthy dietary pattern.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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