

# Managing Hypertension with the Mediterranean Diet

## Aim of This Fact Sheet

This fact sheet provides evidence and recommendations for managing hypertension using the Mediterranean diet.

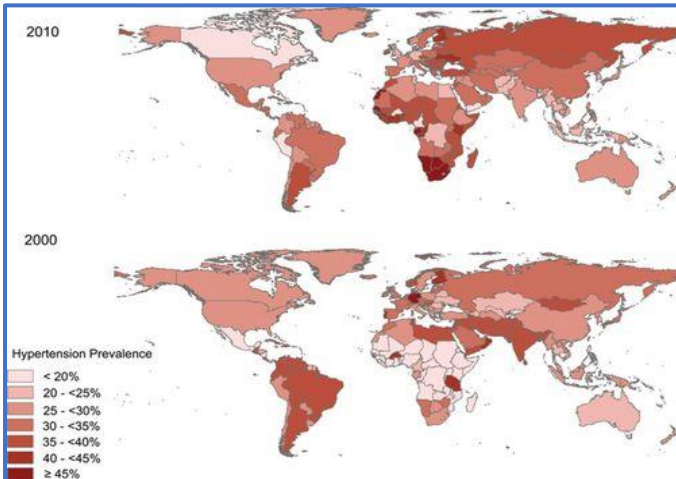


Fig 1: Prevalence of hypertension worldwide in adults 20+ years (11).

## Hypertension

Hypertension is a **common disease** in humans accounting for up to 6% of deaths worldwide within the adult population (1). From 2013 some reports have suggested that 1 billion people worldwide may have hypertension (1). Normal blood pressure is measured **as systolic: between 110 and 130mmhg, and diastolic: between 70 and 80mmhg** (2).

Hypertension is often referred to as a silent killer, as the disease is often **asymptomatic** (1). The determinants of hypertension include both **environmental and genetic** factors; approximately 20 – 60% of cases are inherited (1).

## Pathophysiology

Hypertension can be classified as either ‘essential’ hypertension or ‘secondary’ hypertension (1). Essential hypertension is the most common and has no obvious cause (1). However secondary hypertension usually has a well-defined cause for the increased blood pressure (1).

Excessive dietary intake of sodium, as well as sodium sensitivity are two common causes of hypertension (1). This is due to sodium causing increased fluid volume and preload which raises cardiac output (1). On the other hand, sodium sensitivity may be due to certain individuals whose kidneys have difficulties excreting excessive sodium loads (1). This results in water and salt retention, and an increased fluid volume in the bloodstream (1). Approximately 2-5% of people with hypertension have underlying adrenal or renal disease which causes elevated blood pressure; however, the majority of cases have no clear cause (3).

It is likely that there are numerous interrelated factors which contribute to hypertension which can differ between each patient (3). However, some factors that have been studied include obesity, insulin resistance, the renin-angiotensin system, the sympathetic nervous system and sodium intake (3).

**Obesity and insulin resistance:** The risk of hypertension is higher in those who are obese (4). Some of the mechanisms that may play a part in obesity-related hypertension include: the renin-angiotensin system, the sympathetic nervous system, kidney structural changes, leptin levels and hyperinsulinemia (4). Insulin resistance may also have a moderate association with hypertension, however multiple studies show inconsistent results (5).

**The renin-angiotensin system:** The renin-angiotensin system could possibly be one of the most vital hormone systems that help to regulate blood pressure (6). Renin converts angiotensinogen (a renin substrate) to angiotensin I, which is then converted to angiotensin II (3). Being a powerful vasoconstrictor, angiotensin II is responsible for raising blood pressure (3). However, renin-angiotensin system may not be directly responsible for essential hypertension (3).

**The sympathetic nervous system:** The sympathetic nervous system plays an important role in blood pressure control; having the ability to cause both vasoconstriction and vasodilation (3). However, there is little evidence for a clear connection between epinephrine, norepinephrine and hypertension (3). It is important to consider the sympathetic nervous system in hypertension, and its role in combination with the renin-angiotensin system and other factors such as drugs, circulating volume, certain hormones and sodium (3).

**Sodium intake:** Multiple studies have shown a direct relationship between blood pressure and sodium intake (7). However, dietary sodium has the most impact to those with hypertension (7).

## The Evidence

In primitive populations where diets are very low in salt, hypertension is rare suggesting that low-salt diets may provide protection against hypertension (1). However, in Western society only about one third of people develop hypertension even though the majority consume high salt diets (1). This also may be due to sodium sensitivity to variable degrees (1).

Studies have shown that food typical to a Mediterranean diet can reduce the risk of hypertension (8). This includes fruits, vegetables, whole grains, nuts and olive oil (8). This is compared to food that is normally part of a Western diet such as processed meat, red meat and poultry which had negative effects on the risks of hypertension (8).

## How the Mediterranean Diet Influences Hypertension

One of the most influential components of the Mediterranean diet which positively effects blood pressure is olive oil (8). The monounsaturated and polyunsaturated fatty acids in olive oil assist with lowering blood pressure levels and reducing the risk of hypertension (9). There is also evidence that olive oil improves the blood lipid profile (9).

In one study, significantly lower blood pressure was seen in patients with a high risk of cardiovascular disease when compared to a control group after supplementing with extra virgin olive oil (9). Other studies show that the polyphenols in olive oil have a positive effect on blood pressure (8). Red wine, which is another component of the Mediterranean diet also contains polyphenols (9).

The Mediterranean diet contains high amounts of fish which help to lower blood pressure, and low amounts of red meat (9). Red meat is associated with an increased risk of hypertension (9). The Mediterranean diet also has positive effects on body weight which is beneficial for overall metabolic health (9). The high consumption of fruits, vegetables, whole grains and legumes in the Mediterranean diet provide a diet rich in antioxidants and fibre, both important components in lowering the risk of hypertension (9).

## Dietary Recommendations

1. **Consume a diet rich in vegetables, fruits, whole grains and legumes:** These foods are key components of the Mediterranean diet and show positive effects in lowering blood pressure (9).
2. **Replace saturated fats with olive oil:** Olive oil is major part of the Mediterranean diet, providing polyphenols which are shown to have a positive effect on blood pressure (8).
3. **Add more fish to the diet and reduce red meat:** The Mediterranean diet contains high amounts of fish and low amounts of red meat; this is associated with a reduced risk of hypertension (9).
4. **Reduce salt intake:** High dietary sodium is associated with hypertension (7). Lowering salt intake can have positive effects on blood pressure levels (7).
5. **Remain active:** Maintaining a healthy weight lowers the risk of hypertension (4).

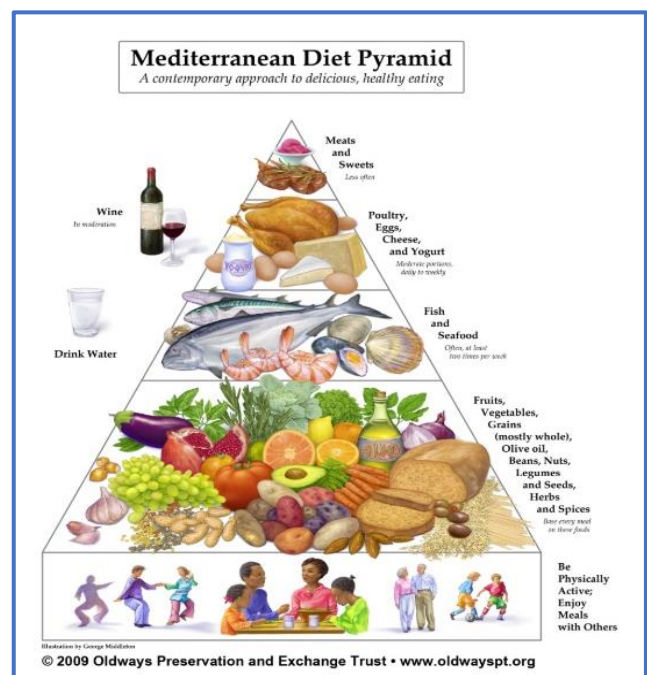


Fig 2: Mediterranean diet pyramid (10).

## References

1. Lip GYH, Nadar S. Hypertension. New York, NY: OUP Oxford; 2015.
2. Blood pressure (high) - hypertension: Better Health Channel; 2011 [15 April 2019]. Available from: <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/blood-pressure-high-hypertension>.
3. Beevers G, Lip GY, O'Brien E. ABC of hypertension: The pathophysiology of hypertension. BMJ (Clinical research ed). 2001;322(7291):912-6.
4. Re RN. Obesity-related hypertension. The Ochsner journal. 2009;9(3):133-6.
5. Saad Mohammed F, Rewers M, Selby J, Howard G, Jinagouda S, Fahmi S, et al. Insulin Resistance and Hypertension. Hypertension. 2004;43(6):1324-31.
6. Sparks MA, Crowley SD, Gurley SB, Mirotsoiu M, Coffman TM. Classical Renin-Angiotensin system in kidney physiology. Comprehensive Physiology. 2014;4(3):1201-28.
7. Cook NR, Appel LJ, Whelton PK. Sodium Intake and All-Cause Mortality Over 20 Years in the Trials of Hypertension Prevention. Journal of the American College of Cardiology. 2016;68(15):1609.
8. De Pergola G, D'Alessandro A. Influence of Mediterranean Diet on Blood Pressure. Nutrients. 2018;10(11):1700.
9. La Verde M, Mulè S, Zappalà G, Privitera G, Maugeri G, Pecora F, et al. Higher adherence to the Mediterranean diet is inversely associated with having hypertension: is low salt intake a mediating factor? International Journal of Food Sciences and Nutrition. 2018;69(2):235-44.
10. Mediterranean Diet Pyramid. Oldways Preservation and Exchange Trust; 2009.
11. Mills Katherine T, Bundy Joshua D, Kelly Tanika N, Reed Jennifer E, Kearney Patricia M, Reynolds K, et al. Global Disparities of Hypertension Prevalence and Control. Circulation: American Heart Association; 2016. p. Figure 2.