International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	THE IMPACT OF THE DASH AND MEDITERRANEAN DIETS ON BLOOD PRESSURE AND CARDIOVASCULAR RISK FACTORS: A REVIEW OF SCIENTIFIC EVIDENCE AND PRACTICAL IMPLICATIONS
ARTICLE INFO	Konrad Strużek, Agnieszka Kwiatkowska, Ewelina Mączka, Wiktor Tracz, Patrycja Świercz, Kinga Teper, Sandra Khiralla-Gawlik, Aleksandra Anna Strzelecka, Aleksandra Ewa Basak. (2025) The Impact of The Dash and Mediterranean Diets on Blood Pressure and Cardiovascular Risk Factors: A Review of Scientific Evidence and Practical Implications. *International Journal of Innovative Technologies in Social Science*. 3(47). doi: 10.31435/ijitss.3(47).2025.3663
DOI	https://doi.org/10.31435/ijitss.3(47).2025.3663
RECEIVED	25 July 2025
ACCEPTED	06 September 2025
PUBLISHED	12 September 2025
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THE IMPACT OF THE DASH AND MEDITERRANEAN DIETS ON BLOOD PRESSURE AND CARDIOVASCULAR RISK FACTORS: A REVIEW OF SCIENTIFIC EVIDENCE AND PRACTICAL IMPLICATIONS

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ABSTRACT

Introduction: Hypertension is one of the major risk factors for premature mortality and cardiovascular diseases. Lifestyle modifications, including diet, play a crucial role in its prevention and treatment. The aim of this review was to assess the impact of the DASH diet and the Mediterranean diet (MedDiet) on blood pressure values.
Materials and methods: Data from randomized controlled trials (RCTs) and meta-analyses examining the effects of the DASH and MedDiet on systolic (SBP) and diastolic blood pressure (DBP) were analyzed. The review included key studies such as PREMIER, DASH-Sodium, ENCORE, PREDIMED, as well as meta-analyses published up to 2021.
Results: The DASH diet was associated with significant reductions in SBP and DBP, particularly when combined with sodium reduction, weight loss, and increased physical activity. The MedDiet also contributed to blood pressure lowering, although the effect was smaller (average reduction in SBP by 1.5 mmHg and in DBP by 0.9 mmHg compared to other diets) and depended on the study population and control group.
Conclusions: Both the DASH and Mediterranean diets are effective non-pharmacological strategies for managing hypertension. Their implementation should be supported through counseling, mobile technology, and systemic actions. Further RCTs with sodium intake monitoring are needed to more fully assess the impact of the MedDiet on blood pressure.

KEYWORDS

DASH Diet, Mediterranean Diet, Hypertension, Blood Pressure, Lifestyle, Cardiovascular Diseases, Dietary Interventions, Meta-Analysis, Meta-Analysis, Mobile Technology

CITATION

Konrad Strużek, Agnieszka Kwiatkowska, Ewelina Mączka, Wiktor Tracz, Patrycja Świercz, Kinga Teper, Sandra Khiralla-Gawlik, Aleksandra Anna Strzelecka, Aleksandra Ewa Basak. (2025) The Impact of The Dash and Mediterranean Diets on Blood Pressure and Cardiovascular Risk Factors: A Review of Scientific Evidence and Practical Implications. *International Journal of Innovative Technologies in Social Science*. 3(47). doi: 10.31435/ijitss.3(47).2025.3663

Introduction.

Hypertension remains one of the key contributors to premature morbidity and mortality worldwide [1], as elevated blood pressure is a significant risk factor for impaired cardiovascular and renal function [2,3]. Increased blood pressure values result from complex interactions between genetic predisposition and environmental factors [4]. Numerous studies indicate that both individual dietary components, such as sodium and potassium, and specific dietary patterns, such as the DASH diet (Dietary Approaches to Stop Hypertension), have a direct association with blood pressure reduction [5]. Among dietary models recognized as effective strategies for lowering blood pressure are the DASH diet and the Mediterranean diet (MedDiet) [11,12]. To reduce the burden of hypertension and achieve proper blood pressure control, current hypertension management guidelines emphasize the importance of lifestyle modifications, including healthy eating habits, as an integral part of therapy regardless of the use of antihypertensive medications [6,7]. The impact of the DASH diet on blood pressure was first described over 20 years ago during the initial randomized controlled DASH trial, which evaluated the effects of three different dietary patterns on blood pressure levels in a controlled feeding setting. The “combination” diet—rich in fruits, vegetables, and low-fat dairy products, now known as the DASH diet—proved effective in lowering both systolic blood pressure (SBP) and diastolic blood pressure (DBP) compared to a control diet and a diet rich only in fruits and vegetables [8]. Subsequent clinical trials have consistently confirmed that adherence to the DASH diet, whether as a standalone intervention or combined with other lifestyle modifications—such as sodium reduction, weight loss, or increased physical activity—leads to significant reductions in blood pressure across a wide range of baseline levels [9]. The DASH diet, firmly grounded in evidence-based research, promotes increased intake of vegetables, fruits, whole grains, low-fat dairy products, and lean protein sources, while recommending reduced consumption of sodium, processed foods, and sugar-sweetened beverages. Adherence to these dietary recommendations supports the achievement and maintenance of blood pressure values within the optimal range [10].

Review

The effectiveness of the DASH diet in the treatment of hypertension and in supporting cardiovascular health has been well documented in the scientific literature. Numerous clinical trials and meta-analyses provide robust evidence confirming the value of this dietary model as a key component of non-pharmacological management of hypertension.

The PREMIER study was one of the pivotal trials evaluating the impact of comprehensive lifestyle interventions, including the DASH diet, on blood pressure levels. The study included 810 participants with prehypertension (120–139/80–89 mmHg) and stage 1 hypertension (140–149/90–95 mmHg). Participants were randomly assigned to one of three groups: an advice-only group, a comprehensive lifestyle intervention group (including weight loss, increased physical activity, sodium and alcohol reduction), and a comprehensive lifestyle intervention group enriched with the DASH diet. The results showed an average systolic blood pressure reduction of 6.6 mmHg in the advice-only group, 10.1 mmHg in the comprehensive intervention group, and 11.1 mmHg in the comprehensive intervention group with the DASH diet [13].

The DASH-Sodium trial aimed to assess the effect of sodium intake levels combined with the DASH diet on blood pressure values. Participants were assigned to one of three groups: a control group following a typical American diet, a group following the DASH diet with higher sodium intake, and a group following the DASH diet with reduced sodium intake. The findings demonstrated that the DASH diet alone led to a significant reduction in blood pressure, while additional sodium restriction resulted in an even greater antihypertensive effect. The average reduction in systolic blood pressure in the DASH diet group with low sodium intake was 7.1 mmHg in individuals without hypertension and 11.5 mmHg in those with hypertension [14].

The **OmniHeart** study aimed to evaluate the impact of three different dietary patterns—including modified versions of the DASH diet—on blood pressure values and cardiovascular risk parameters. The study analyzed diets enriched with either protein, unsaturated fatty acids, or carbohydrates in individuals diagnosed with hypertension or prehypertension. The results showed that all dietary interventions led to reductions in blood pressure, with the greatest changes observed in participants following the modified DASH diet variants compared to the classic version of this dietary model [15].

Saneei and colleagues conducted a systematic review and meta-analysis using a random-effects model to assess the effect of the DASH diet on blood pressure values. The analysis included 17 randomized controlled trials (RCTs) involving 2,561 participants. The results demonstrated statistically significant reductions in systolic blood pressure by an average of 6.74 mmHg and diastolic blood pressure by 3.54 mmHg. Subgroup analysis revealed that the greatest blood pressure reductions were observed in studies that incorporated calorie restriction and in populations with diagnosed hypertension. Additionally, baseline blood pressure levels were identified as a significant factor contributing to variability among studies. These findings confirm the potential of the DASH diet to lower blood pressure, although the degree of its effectiveness depends on factors such as energy intake and baseline blood pressure levels [16].

Blumenthal and colleagues examined the combined effects of the DASH diet, regular physical activity, and weight loss on blood pressure values and cardiovascular function biomarkers. The ENCORE study enrolled overweight individuals with elevated blood pressure. Participants were assigned to one of three groups: a group following the DASH diet alone, a group following the DASH diet combined with a behavioral weight management program, and a control group maintaining their usual dietary habits. The results showed statistically significant reductions in systolic blood pressure in both intervention groups, with the greatest reduction observed in the group combining the DASH diet with weight control and exercise (16.1 mmHg), compared to the DASH diet alone (11.2 mmHg) and the control group (3.4 mmHg). Importantly, the combined intervention also led to improvements in vascular and autonomic function as well as a reduction in left ventricular mass, highlighting the added benefits of integrating physical activity and weight loss with the DASH diet in overweight individuals with hypertension [17].

Additionally, a study published in the *American Heart Association Journal* in 2001 assessed the efficacy of the DASH diet in the treatment of stage 1 isolated systolic hypertension (ISH). Among 459 participants in the DASH trial, 72 individuals were identified with ISH. During the dietary intervention, those following the DASH diet experienced a significant mean reduction in systolic blood pressure of 11.8 ± 9.3 mmHg, as well as a substantial decrease in diastolic blood pressure values. Notably, urinary sodium levels did not differ significantly between the study groups, whereas urinary potassium excretion increased in both the DASH and the fruit-and-vegetable-rich diet groups [18].

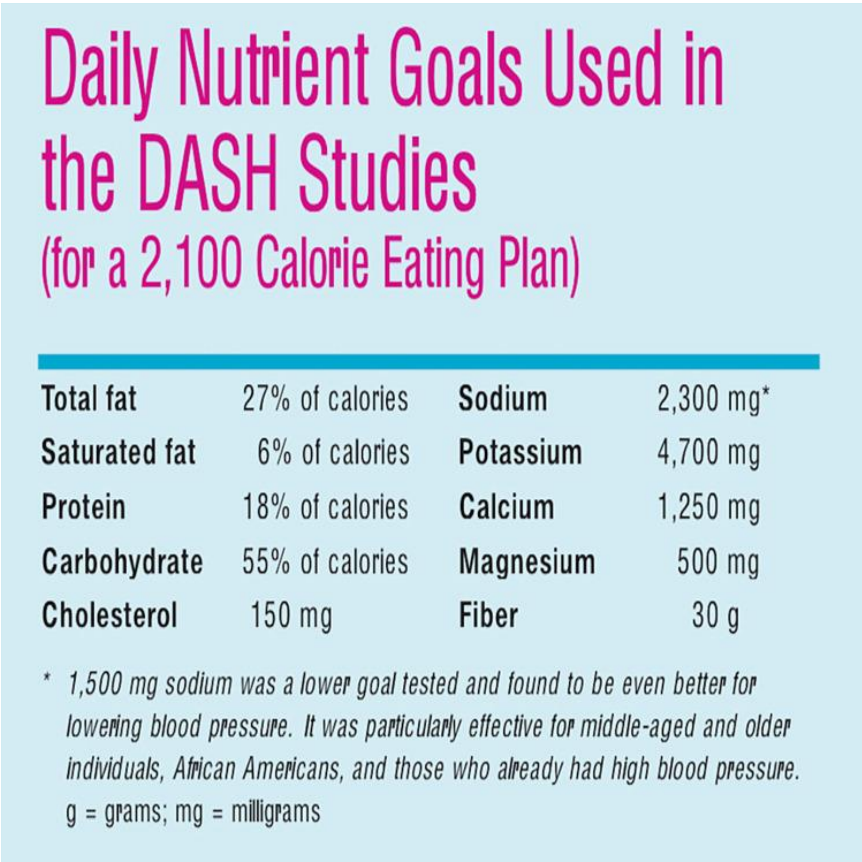
In addition to the well-documented effectiveness of the DASH diet in lowering blood pressure, increasing evidence points to its broad range of health benefits. The DASH dietary pattern has a significant impact on lipid profiles, leading to reductions in low-density lipoprotein (LDL) cholesterol and triglyceride levels. Although changes in high-density lipoprotein (HDL) cholesterol and total cholesterol did not reach statistical significance, adherence to the DASH diet was associated with an approximately 13% reduction in the estimated 10-year risk of cardiovascular disease [19].

Furthermore, adherence to a dietary pattern consistent with the DASH diet has been linked to a reduced risk of heart failure in individuals under 75 years of age, as well as to lower rates of hospitalization due to heart failure and reduced mortality from heart failure in men [20,21].

The combination of the DASH diet with sodium restriction has shown complementary effects in reducing bone turnover, thereby contributing to improved bone mineral metabolism. This effect was confirmed through observed reductions in serum osteocalcin and C-terminal telopeptide of type 1 collagen, as well as decreases in parathyroid hormone (PTH) levels and urinary calcium excretion [22].

The DASH diet also demonstrates beneficial effects in lowering serum uric acid levels. A randomized controlled trial conducted by Tang and colleagues showed significant reductions in uric acid levels after both 30 and 90 days of adherence to this dietary model, indicating its potential usefulness in managing hyperuricemia and gout. Moreover, numerous studies have shown a significant association between adherence to the DASH diet and reduced all-cause mortality [23,24].

Practical aspects of implementing the DASH diet should begin with referring the patient to a qualified dietitian to assess the suitability of this dietary model for individual needs. The next steps include estimating the patient's caloric requirements and conducting a detailed discussion on the benefits of meal planning, setting weight goals, and using shopping lists as tools to support adherence to dietary recommendations. Additionally, educating patients on healthy cooking techniques and, where possible, encouraging participation in relevant culinary workshops is recommended (see Figures 1–2) [25].



Daily Nutrient Goals Used in the DASH Studies (for a 2,100 Calorie Eating Plan)

Total fat	27% of calories	Sodium	2,300 mg*
Saturated fat	6% of calories	Potassium	4,700 mg
Protein	18% of calories	Calcium	1,250 mg
Carbohydrate	55% of calories	Magnesium	500 mg
Cholesterol	150 mg	Fiber	30 g

* 1,500 mg sodium was a lower goal tested and found to be even better for lowering blood pressure. It was particularly effective for middle-aged and older individuals, African Americans, and those who already had high blood pressure.
g = grams; mg = milligrams

Fig. 1. *Daily nutritional targets for the 2,100-calorie meal plan used in DASH studies.*
Source: [26]

Food Group	Daily Servings (Except as noted)	Serving Sizes
Whole Grains	6-8	1 slice 100% whole grain bread 1 cup whole grain cereal ½ cup cooked rice, quinoa, or whole grain pasta
Vegetables	4-5	1 cup raw leafy vegetables ½ cup cooked vegetable ½ cup vegetable juice
Fruits	4-5	1 medium whole fruit ½ cup fresh or frozen fruit ¼ cup unsweetened dried fruit
Fat-free or low-fat dairy products	2-3	1 cup milk 1 cup yogurt 1½ ounces cheese
Lean meats, poultry, and fish	6 or less	1 ounces cooked lean meats, poultry, or fish 1 egg
Nuts, seeds, and legumes	4-5 *per week*	1/3 cup or 1 ½ ounces nuts 2 tablespoons or ½ ounce seeds ½ cup cooked legumes (dried beans or peas)
Fats and oils	2-3	1 tablespoon mayonnaise 2 tablespoons salad dressing 1 teaspoon olive oil or vegetable oil
Sweets and added sugars	5 or less *per week*	1 tablespoon sugar 1 tablespoon jelly or jam, or syrup ½ cup sorbet, 1 cup lemonade

Fig. 2. *A typical example of a DASH meal plan.*
Source: [27]

To enhance the effectiveness of implementing the DASH diet in adults with hypertension, it is crucial to provide appropriate counseling and health education. The United States Preventive Services Task Force classifies counseling interventions by intensity into three categories: brief, medium-intensity, and high-intensity. Brief interventions, typically lasting about five minutes and delivered during routine medical visits, focus on conveying simple, actionable lifestyle modification recommendations. Medium-intensity sessions, lasting at least 30 minutes, take the form of individual or group meetings led by qualified dietitians and primary care professionals. These sessions may include thematic discussions, motivational counseling, and motivational interviewing techniques. The most advanced, high-intensity interventions can be implemented over periods of up to six years, bringing about lasting behavioral changes. Examples of such initiatives include workshops, seminars, or retreat-style educational programs enriched with regular follow-up sessions to monitor participants' progress [28].

In today's society, the role of technology and digital advancement is indispensable in nearly every aspect of life, including health promotion and nutrition. Recent studies highlight the innovative use of technology in the implementation of the DASH diet. A system has been described that takes into account key factors related to dietary recommendations, enabling users to enter data via a mobile application. This data, stored in the cloud, is processed by a system that generates personalized recommendations based on DASH dietary guidelines. Thanks to integration with mobile devices—an integral part of daily life—this solution offers high practicality and accessibility. The cloud-based system ensures secure storage and authentication of data, while additional features such as user profile creation and a DASH-compliant food database exemplify the possibilities provided by modern technology [29].

Government-level policy actions play a significant role in supporting the implementation and promotion of the DASH diet, particularly in areas where appropriate infrastructure and social conditions are conducive. One of the key elements of these policies is ensuring the availability of foods recommended in the DASH diet across a wide network of retail outlets and grocery stores. These initiatives align with global guidelines that promote a healthy lifestyle, as formulated by leading international organizations. Such recommendations include, among others, the *Dietary Guidelines for Americans*, the guidelines of the *National Cancer Institute*, and the *Step II Diet* program within the *National Cholesterol Education Program* [30].

Mediterranean Diet and Blood Pressure Reduction

The Mediterranean diet (MedDiet) represents a dietary pattern that emphasizes high consumption of whole grains, vegetables, fruits, legumes, and nuts. It is characterized by an increased total fat content, with olive oil serving as the primary source of added fat. This model also includes regular consumption of fish and seafood, low-fat dairy products, poultry, and eggs, while limiting the intake of red meat, sweets, and sugar-sweetened beverages. A characteristic feature of the MedDiet is moderate alcohol consumption, particularly red wine, typically consumed with meals [31].

The Mediterranean diet contains a range of components considered especially beneficial for health. These include a high content of nutrients with antioxidant and anti-inflammatory properties, dietary fiber, omega-3 polyunsaturated fatty acids, and monounsaturated fatty acids. Moderate ethanol intake, mainly in the form of red wine, is also characteristic, along with a low intake of trans fats, saturated fats, and dietary cholesterol [32].

The synergistic action of MedDiet components contributes to the attenuation of indirect pathways involved in the development of atherosclerosis and thrombosis in cardiovascular diseases (CVD), primarily through protective effects on endothelial function resulting from reductions in oxidative stress and inflammation [33]. Furthermore, MedDiet components have a beneficial influence on many CVD risk factors, including the lowering of elevated blood pressure, although the mechanisms underlying this antihypertensive effect have not yet been fully elucidated [34].

Olive oil is regarded as one of the key components of the Mediterranean diet that may positively influence blood pressure levels. It is rich in monounsaturated fatty acids, vitamin E, and polyphenols—especially flavonoids—that may enhance nitric oxide bioavailability, promote vasodilation, and improve endothelial function [35]. Additionally, fruits and vegetables, rich in vitamins (e.g., vitamin C), minerals (e.g., potassium), dietary fiber, bioactive compounds (such as phytosterols and inorganic nitrates), and phytochemicals (including polyphenols, especially flavonoids), may support endothelium-dependent vasodilation and inhibit platelet aggregation [36]. The beneficial effects of whole grains on blood pressure are attributed to their high fiber content and minerals associated with fiber intake [37]. Red wine, as a complex mixture of bioactive compounds such as polyphenols (including resveratrol), exhibits antioxidant and anti-inflammatory effects that translate into positive impacts on the cardiovascular system [38].

The 2018 guidelines of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH) on the management of arterial hypertension recommend the adoption of a healthy, balanced dietary pattern, such as the Mediterranean diet (MedDiet), for patients with hypertension [39]. Additionally, the 2021 ESC guidelines on cardiovascular disease prevention advocate the implementation of the MedDiet or a comparable dietary pattern to reduce cardiovascular risk, with a particular emphasis on favoring plant-based foods over animal-based products [40].

The first evidence of the cardioprotective effect of the Mediterranean diet (MedDiet) emerged in the 1970s from the Seven Countries Study led by Ancel Keys. Keys observed that certain populations residing in the Mediterranean basin had specific dietary habits that, as hypothesized, could contribute to the lower cardiovascular mortality seen in these regions compared to populations in Northern Europe and the United States [41]. Over subsequent decades, the MedDiet has become one of the most extensively studied dietary patterns, and its definition—originally proposed by Keys—has been substantially refined [42]. Today, a large body of evidence documents the health benefits associated with adherence to the MedDiet, particularly in relation to metabolic syndrome, type 2 diabetes (T2D), cardiovascular disease (CVD), as well as certain neurodegenerative diseases and cancers [43,44]. With regard to the MedDiet's influence on blood pressure levels, numerous studies have shown that consumption of foods characteristic of this dietary pattern is associated with a lower risk of developing hypertension, whereas consumption of foods uncharacteristic of the MedDiet, such as red and processed meat, is linked to elevated blood pressure [45].

The **PREvención con DIETa MEDiterránea (PREDIMED)** study was designed to assess the effect of the Mediterranean diet (MedDiet) on the primary prevention of cardiovascular diseases (CVD). This landmark trial involved nearly 7,500 participants at high cardiovascular risk. It compared two variations of the MedDiet—one supplemented with extra virgin olive oil and the other with mixed nuts—to a low-fat control diet. Participants were not required to restrict calorie or sodium intake. All groups received dietary counseling, including group sessions tailored to the type of intervention, to support adherence to the assigned diet. In addition, participants in the MedDiet groups were provided with supplemental products (extra virgin olive oil or nuts) to ensure adequate intake of these key components. After a median follow-up of 3.8 years, greater reductions in diastolic blood pressure (DBP) were observed in the MedDiet groups compared to the low-fat diet: –1.5 mmHg (95% CI: –2.0

to –1.0) for the olive oil-supplemented diet and –0.7 mmHg (95% CI: –1.2 to –0.2) for the nut-supplemented diet. As for systolic blood pressure (SBP), differences observed after 4 years were only evident in unadjusted analyses and lost statistical significance after adjustment for confounding factors in multivariate analyses [46].Although the Mediterranean diet (MedDiet) has been extensively studied for its impact on cardiovascular risk factors, data regarding its effects on blood pressure (BP) values remained inconclusive until recently. The results of available studies were often inconsistent, due to both methodological differences and variability in the populations studied. Moreover, many studies were not originally designed to evaluate the antihypertensive effect of the MedDiet. In recent years, however, several meta-analyses of randomized controlled trials (RCTs) have been conducted to more precisely determine the impact of the MedDiet on blood pressure values; the results of these analyses are summarized in Table 3 [47, 48, 49, 50, 51, 52, 53].

Table 1. Effect of the MedDiet on BP: Results from published meta-analyses of RCTs examining the effect of the MedDiet on SBP and DBP in adults.

Author, year	Studies, n	Participants, n	Duration of trials	BP difference (mmHg)	
			Range	SBP	DBP
				Mean (95% CI)	Mean (95% CI)
Nordmann, *et al*., 2011	6	2650	2–4 years	Versus low-fat diet	Versus low-fat diet
				–1.7 (–3.3; –0.1)	–1.5 (–2.1; –0.8)
Nissensohn, *et al*., 2016	6	7987	2–4 years	Versus low-fat diet	Versus low-fat diet
				–1.5 (–2.9; 0.0)	–0.7 (–1.3; –0.1)
Ndanuko, *et al*., 2016	3	535	1–2 years	Versus usual/low-fat/prudent diet	Versus usual/low-fat/prudent diet
				–3.0 (–3.5; –2.6)	–1.9 (–2.3; –1.7)
Gay, *et al*., 2016	4	7703	2–4 years	Versus usual/low-fat/prudent diet	Versus usual/low-fat/prudent diet
				–1.2 (–2.8; 0.5)	–1.5 (–2.1; –0.8)
Rees, *et al*., 2019	Versus no/minimal interventio n	Versus no/minimal intervention	Versus no/minimal intervention	Versus no/minimal intervention	Versus no/minimal intervention
	2	269	3–24 months	–2.9 (–3.5; –2.5)	–2.0 (–2.3; –1.7)
	Versus another dietary interventio n	Versus another dietary intervention	Versus another dietary intervention	Versus another dietary intervention	Versus another dietary intervention
	4	448	3–12 months	–1.5 (–3.9; 0.9)	–0.2 (–2.4; 1.9)

Cowell, *et al.*, 2021	19	4137	1.5 week–5 years	Versus habitual/low–fat/other diet	Versus habitual/low–fat/other diet
				–1.4 (–2.4; –0.4)	–1.5 (–2.7; –0.3)
Filippou, *et al.*, 2021	35	13,943	6 weeks–3.7 years	Versus usual diet/other dietary intervention	Versus usual diet/other dietary intervention
				–1.5 (–2.8; –0.1)	–0.9 (–1.5; –0.3)
				Versus usual diet	Versus usual diet
				–3.1 (–4.8; –1.3)	–1.6 (–2.6; –0.6)
				Versus all other dietary interventions	Versus all other dietary interventions
				–0.2 (–1.9; 1.5)	–0.6 (–1.3; 0.1)
				Versus low-fat diet	Versus low-fat diet
				–0.1 (–1.1; 0.9)	–0.7 (–1.5; 0.1)

BP, blood pressure; CI, confidence interval; DBP, diastolic blood pressure; RCT, randomized controlled trial; SBP, systolic blood pressure.

Meta-analyses conducted to date to evaluate the impact of the Mediterranean diet (MedDiet) on blood pressure (BP) have provided inconclusive results. Additionally, in many studies, BP reduction estimates were based on differences relative to baseline values within individual study groups, which may have introduced the risk of bias in the analysis of outcomes. Unlike previous work, in our recently conducted meta-analysis, we sought to address these limitations and estimated the effect of the MedDiet on achieved BP reduction during follow-up, compared with usual diet or other dietary interventions [12]. The results showed that the MedDiet, compared with all other diets (usual diet or another dietary intervention), reduced systolic BP (SBP) by –1.5 mmHg (95% CI: –2.8 to –0.1) and diastolic BP (DBP) by –0.9 mmHg (95% CI: –1.5 to –0.3). Compared only with the usual diet, the reductions were –3.1 mmHg (95% CI: –4.8 to –1.3) for SBP and –1.6 mmHg (95% CI: –2.6 to –0.6) for DBP. However, when compared with other active dietary interventions, including a low-fat diet, the MedDiet did not demonstrate an additional hypotensive effect, suggesting it is equally effective in lowering BP as other dietary interventions such as prudent, hypolipidemic, or modified-carbohydrate diets. Due to the limitations of available data, it was not possible to conduct a comparative analysis of the MedDiet's effect on BP in hypertensive versus non-hypertensive individuals, as most studies included mixed populations. Moreover, in the few studies conducted exclusively in normotensive individuals, the effect of the MedDiet on BP was not statistically significant [47].

The effect of sodium intake on BP in the context of the MedDiet remains incompletely defined. Unlike the DASH diet, the MedDiet was not specifically designed to lower blood pressure, and its impact on BP has been studied mainly in relation to the reduction of other cardiovascular disease (CVD) risk factors such as overweight and obesity, hyperglycemia, or dyslipidemia, based on evidence linking it to lower CVD mortality. Randomized controlled trials (RCTs) assessing the MedDiet's impact on BP were rarely designed with parallel sodium-reduction strategies. Although the MedDiet does not impose specific sodium intake limits, it promotes the consumption of foods naturally low in sodium, such as fruits and vegetables. As a result, individuals with high adherence to the MedDiet typically have lower sodium intake, and salt reduction often occurs secondarily as part of dietary intervention adherence [54]. However, based on the available RCT data, it is not possible to definitively determine to what extent sodium reduction contributes to the MedDiet's observed hypotensive effects. Unlike studies assessing the DASH diet combined with sodium restriction, analyses of the MedDiet lack similar data, as these studies do not provide sufficient information on changes in sodium intake. Nevertheless, it can be hypothesized that the MedDiet's beneficial effect on hypertension risk is related to its overall more optimal profile of micro- and macronutrients and minerals, which helps reduce oxidative stress and inflammation, and decreases exposure to potentially harmful dietary elements, including excess salt [55].

Conclusions

The conclusions drawn from this literature review indicate that both the DASH diet and the Mediterranean diet represent effective non-pharmacological strategies in the management of arterial hypertension and the prevention of cardiovascular diseases. The DASH diet demonstrates a clear antihypertensive effect, particularly when combined with sodium reduction, weight loss, and increased physical activity. In contrast, although the primary aim of the Mediterranean diet is not blood pressure reduction, it contributes to better blood pressure control through its beneficial impact on overall dietary quality, reduction of oxidative stress and inflammation, and decreased intake of harmful components such as trans fats or excessive salt. Successful implementation of both dietary models requires appropriate dietary counseling, the use of technological tools such as mobile applications that support dietary planning and monitoring, as well as policy actions that ensure broad access to healthy foods. Despite the substantial body of scientific evidence, further research—especially well-designed randomized controlled trials with precise sodium intake monitoring—is necessary to better assess the independent effect of the Mediterranean diet on blood pressure levels.

REFERENCES

1. WHO. Global Health Observatory (GHO) data: raised blood pressure: situation and trends. [Internet] Geneva: WHO; [cited February, 2016]. Available from: http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/
2. Mule G, Castiglia A, Cusumano C, Scaduto E, Geraci G, Altieri D, Di Natale E, Cacciatore O, Cerasola G, Cottone S. Subclinical kidney damage in hypertensive patients: a renal window opened on the cardiovascular system. Focus on microalbuminuria. Adv Exp Med Biol. 2017;956:279–306.
3. Kjeldsen SE. Hypertension and cardiovascular risk: general aspects. Pharmacol Res. 2018;129:95–9.
4. Bazzano LA, Green T, Harrison TN, Reynolds K. Dietary approaches to prevent hypertension. Curr Hypertens Rep. 2013;15:694–702.
5. Savica V, Bellinghieri G, Kopple JD. The effect of nutrition on blood pressure. Annu Rev Nutr. 2010;30:365–401.
6. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, Clement DL, Coca A, de Simone G, Dominiczak A et al.. 2018 ESC/ESH Guidelines for the management of arterial hypertension. Eur Heart J. 2018;39:3021–104.
7. Whelton PK, Carey RM, Aronow WS, Casey DE Jr, Collins KJ, Dennison Himmelfarb C, DePalma SM, Gidding S, Jamerson KA, Jones DW et al.. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71:2199–269.
8. Appel LJ. The effects of dietary factors on blood pressure. Cardiol Clin. 2017;35:197–212.
9. Chiavaroli L, Viguiliouk E, Nishi SK, Blanco Mejia S, Rahelić D, Kahleová H, Salas-Salvadó J, Kendall CW, Sievenpiper JL. DASH dietary pattern and cardiometabolic outcomes: an umbrella review of systematic reviews and meta-analyses. Nutrients. 2019;11:338.
10. Your Guide to Lowering Blood Pressure With DASH. National Heart, Lung Lung, and Blood Institute. https://scholar.google.com/scholar?q=intitle:National%20Heart%2C%20Lung%2C%20and%20Blood%20Institute.%20Your%20guide%20to%20lowering%20blood%20pressure%20with%20DASH NIH Publication. 2006
11. Filippou CD, Tsioufis CP, Thomopoulos CG, Mihas CC, Dimitriadis KS, Sotiropoulou LI, *et al*. Dietary Approaches to Stop Hypertension (DASH) Diet and Blood Pressure Reduction in Adults with and without Hypertension: a Systematic Review and Meta-Analysis of Randomized Controlled Trials. Advances in Nutrition. 2020; 11: 1150–1160.
12. Filippou CD, Thomopoulos CG, Kouremeti MM, Sotiropoulou LI, Nihoyannopoulos PI, Tousoulis DM, *et al*. Mediterranean diet and blood pressure reduction in adults with and without hypertension: a systematic review and meta-analysis of randomized controlled trials. Clinical Nutrition. 2021; 40: 3191–3200.
13. Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial. Appel LJ, Champagne CM, Harsha DW, et al. https://scholar.google.com/scholar?q=intitle:Effects%20of%20comprehensive%20lifestyle%20modification%20on%20blood%20pressure%20control%3A%20main%20results%20of%20the%20PREMIER%20clinical%20trial. JAMA. 2003;23:2083–2093. doi: 10.1001/jama.289.16.2083.
14. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. Sacks FM, Svetkey LP, Vollmer WM, et al. https://scholar.google.com/scholar?q=intitle:Effects%20on%20blood%20pressure%20of%20reduced%20dietary%20sodium%20and%20the%20Dietary%20Approaches%20to%20Stop%20Hypertension%20%28DASH%29%20diet. N Engl J Med. 2001;4:3–10. doi: 10.1056/NEJM200101043440101.

15. Hypertension and lifestyle modification: how useful are the guidelines? Nicoll R, Henein MY. https://scholar.google.com/scholar?q=intitle:Hypertension%20and%20lifestyle%20modification%3A%20how%20useful%20are%20the%20guidelines%3F. Br J Gen Pract J R Coll Gen Pract. 2010;60:879–880. doi: 10.3399/bjgp10X544014.
16. Influence of Dietary Approaches to Stop Hypertension (DASH) diet on blood pressure: a systematic review and meta-analysis on randomized controlled trials. Saneei P, Salehi-Abargouei A, Esmaillzadeh A, Azadbakht L. https://scholar.google.com/scholar?q=intitle:Influence%20of%20Dietary%20Approaches%20to%20Stop%20Hypertension%20%28DASH%29%20diet%20on%20blood%20pressure%3A%20a%20systematic%20review%20and%20meta-analysis%20on%20randomized%20controlled%20trials. Nutr Metab Cardiovasc Dis NMCD. 2014;24:1253–1261. doi: 10.1016/j.numecd.2014.06.008.
17. .Effects of the DASH diet alone and in combination with exercise and weight loss on blood pressure and cardiovascular biomarkers in men and women with high blood pressure: the ENCORE study. Blumenthal JA, Babyak MA, Hinderliter A, et al. https://scholar.google.com/scholar?q=intitle:Effects%20of%20the%20DASH%20diet%20alone%20and%20in%20combination%20with%20exercise%20and%20weight%20loss%20on%20blood%20pressure%20and%20cardiovascular%20biomarkers%20in%20men%20and%20women%20with%20high%20blood%20pressure%3A%20the%20ENCORE%20study. Arch Intern Med. 2010;25:126–135. doi: 10.1001/archinternmed.2009.470.
18. Variation in the estimated costs of pivotal clinical benefit trials supporting the US approval of new therapeutic agents, 2015-2017: a cross-sectional study. Moore TJ, Heyward J, Anderson G, Alexander GC. https://scholar.google.com/scholar?q=intitle:Variation%20in%20the%20estimated%20costs%20of%20pivotal%20clinical%20benefit%20trials%20supporting%20the%20US%20approval%20of%20new%20therapeutic%20agents%2C%202015-2017%3A%20a%20cross-sectional%20study. BMJ Open. 2020;1:10. doi: 10.1136/bmjopen-2020-038863.
19. Effects of the Dietary Approach to Stop Hypertension (DASH) diet on cardiovascular risk factors: a systematic review and meta-analysis. Siervo M, Lara J, Chowdhury S, Ashor A, Oggioni C, Mathers JC. https://dx.doi.org/10.1017/S0007114514003341.%20Epub%202014%20Nov%2028.%20PMID:%2025430608. Br J Nutr. 201514;113:1–15. doi: 10.1017/S0007114514003341.
20. The Dietary Approaches to Stop Hypertension (DASH) diet pattern and incident heart failure. Goyal P, Balkan L, Ringel JB, et al. https://dx.doi.org/10.1016/j.cardfail.2021.01.011.%20PMID:%2033962741%20PMCID:%20PMC8396128. J Card Fail. 2021;27:512–521. doi: 10.1016/j.cardfail.2021.01.011.
21. Relation of consistency with the dietary approaches to stop hypertension diet and incidence of heart failure in men aged 45 to 79 years. Levitan EB, Wolk A, Mittleman MA. https://dx.doi.org/10.1016/j.amjcard.2009.06.061.%20Epub%202009%20Sep%2025.%20PMID:%2019892061%20PMCID:%20PMC2774905. Am J Cardiol. 200915;104:1416–1420. doi: 10.1016/j.amjcard.2009.06.061.
22. The DASH diet and sodium reduction improve markers of bone turnover and calcium metabolism in adults. Lin PH, Ginty F, Appel LJ, et al. https://dx.doi.org/10.1093/jn/133.10.3130.%20PMID:%2014519796. J Nutr. 2003;133:3130–3136. doi: 10.1093/jn/133.10.3130.
23. DASH diet and change in serum uric acid over time. Tang O, Miller ER 3rd, Gelber AC, Choi HK, Appel LJ, Juraschek SP. https://dx.doi.org/10.1007/s10067-017-3613-x.%20Epub%202017%20Mar%2031.%20PMID:%2028361235%20PMCID:%20PMC5821061. Clin Rheumatol. 2017;36:1413–1417. doi: 10.1007/s10067-017-3613-x. [DOI] [PMC free article]
24. Adherence to the dietary approaches to stop hypertension (DASH) diet in relation to all-cause and cause-specific mortality: a systematic review and dose-response meta-analysis of prospective cohort studies. Soltani S, Arablou T, Jayedi A, Salehi-Abargouei A. https://dx.doi.org/10.1186/s12937-020-00554-8.%20PMID:%2032321528%20PMCID:%20PMC7178992. Nutr J. 2020;22:37. doi: 10.1186/s12937-020-00554-8.
25. DASH eating plan: an eating pattern for diabetes management. Amy P. Campbell. https://scholar.google.com/scholar?q=intitle:DASH%20Eating%20Plan%3A%20An%20Eating%20Pattern%20for%20Diabetes%20Management.%20Spectrum%20Diabetes%20Journal. Spectrum Diabetes J. 2017;30:76–81. doi: 10.2337/ds16-0084.
26. Your Guide to Lowering Blood Pressure With DASH. National Heart, Lung Lung, and Blood Institute. https://scholar.google.com/scholar?q=intitle:National%20Heart%2C%20Lung%2C%20and%20Blood%20Institute.%20Your%20guide%20to%20lowering%20blood%20pressure%20with%20DASH NIH Publication. 2006
27. Clifford J, Maloney K, Anderson J, Prior S, Braithwaite D, Sherman B. 2017. Understanding the DASH Diet. Food and Nutrition Series. Health. Fact Sheet No. 9.374.
28. The DASH diet for high blood pressure: from clinical trial to dinner table. Karanja N, Erlinger TP, Pao-Hwa L, Miller ER 3rd, Bray GA. https://scholar.google.com/scholar?q=intitle:The%20DASH%20Diet%20for%20High%20Blood%20Pressure%3A%20From%20Clinical%20Trial%20to%20Dinner%20Table. Cleve Clin J Med. 2004;71:745–753. doi: 10.3949/ccjm.71.9.745.

29. Sookrah R, Dhowtal JD, Nagowah SD. 7th International Conference on Information and Communication Technology (ICoICT) IEEE; 2019. A DASH Diet Recommendation System for Hypertensive Patients Using Machine Learning; pp. 1–6.
30. Dietary interventions on blood pressure: the Dietary Approach to Stopping Hypertension (DASH) trials. Champagne CM. https://scholar.google.com/scholar?q=intitle:Dietary%20Interventions%20on%20Blood%20Pressure%3A%20the%20Dietary%20Approach%20to%20Stopping%20Hypertension%20%28DASH%29%20Trials. Nutr Rev. 2006;64:553–556. doi: 10.1111/j.1753-4887.2006.tb00234.x.
31. Bach-Faig A, Berry EM, Lairon D, Reguant J, Trichopoulou A, Dernini S, *et al*. Mediterranean diet pyramid today. Science and cultural updates. Public Health Nutrition. 2011; 14: 2274–2284.
32. Willett WC, Sacks F, Trichopoulou A, Drescher G, Ferro-Luzzi A, Helsing E, *et al*. Mediterranean diet pyramid: a cultural model for healthy eating. The American Journal of Clinical Nutrition. 1995; 61: 1402S–1406S.
33. Schwingshackl L, Hoffmann G. Mediterranean dietary pattern, inflammation and endothelial function: a systematic review and meta-analysis of intervention trials. Nutrition, Metabolism, and Cardiovascular Diseases. 2014; 24: 929–939.
34. De Pergola G, D'Alessandro A. Influence of Mediterranean Diet on Blood Pressure. Nutrients. 2018; 10: 1700.
35. Medina-Remón A, Estruch R, Tresserra-Rimbau A, Vallverdú-Queralt A, Lamuela-Raventos RM. The effect of polyphenol consumption on blood pressure. Mini Reviews in Medicinal Chemistry. 2013; 13: 1137–1149.
36. Zheng J, Zhou Y, Li S, Zhang P, Zhou T, Xu D, *et al*. Effects and Mechanisms of Fruit and Vegetable Juices on Cardiovascular Diseases. International Journal of Molecular Sciences. 2017; 18: 555.
37. Zheng J, Zhou Y, Li S, Zhang P, Zhou T, Xu D, *et al*. Effects and Mechanisms of Fruit and Vegetable Juices on Cardiovascular Diseases. International Journal of Molecular Sciences. 2017; 18: 555.
38. Chiva-Blanch G, Arranz S, Lamuela-Raventos RM, Estruch R. Effects of wine, alcohol and polyphenols on cardiovascular disease risk factors: evidences from human studies. Alcohol and Alcoholism. 2013; 48: 270–277.
39. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, *et al*. 2018 ESC/ESH Guidelines for the management of arterial hypertension. European Heart Journal. 2018; 39: 3021–3104.
40. Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Bäck M, *et al*. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. European Heart Journal. 2021; 42: 3227–3337.
41. Keys A. Coronary heart disease in seven countries. Summary. Circulation. 1970; 41: I186–I195.
42. Davis C, Bryan J, Hodgson J, Murphy K. Definition of the Mediterranean Diet; a Literature Review. Nutrients. 2015; 7: 9139–9153.
43. Sofi F, Cesari F, Abbate R, Gensini GF, Casini A. Adherence to Mediterranean diet and health status: meta-analysis. British Medical Journal. 2008; 337: a1344.
44. Dinu M, Pagliai G, Casini A, Sofi F. Mediterranean diet and multiple health outcomes: an umbrella review of meta-analyses of observational studies and randomised trials. European Journal of Clinical Nutrition. 2018; 72: 30–43.
45. Ozemek C, Laddu DR, Arena R, Lavie CJ. The role of diet for prevention and management of hypertension. Current Opinion in Cardiology. 2018; 33: 388–393.
46. Toledo E, Hu FB, Estruch R, Buil-Cosiales P, Corella D, Salas-Salvadó J, *et al*. Effect of the Mediterranean diet on blood pressure in the PREDIMED trial: results from a randomized controlled trial. BMC Medicine. 2013; 11: 207.
47. Filippou CD, Thomopoulos CG, Kouremeti MM, Sotiropoulou LI, Nihoyannopoulos PI, Tousoulis DM, *et al*. Mediterranean diet and blood pressure reduction in adults with and without hypertension: a systematic review and meta-analysis of randomized controlled trials. Clinical Nutrition. 2021; 40: 3191–3200.
48. Ndanuko RN, Tapsell LC, Charlton KE, Neale EP, Batterham MJ. Dietary Patterns and Blood Pressure in Adults: a Systematic Review and Meta-Analysis of Randomized Controlled Trials. Advances in Nutrition. 2016; 7: 76–89.
49. Gay HC, Rao SG, Vaccarino V, Ali MK. Effects of Different Dietary Interventions on Blood Pressure: Systematic Review and Meta-Analysis of Randomized Controlled Trials. Hypertension. 2016; 67: 733–739.
50. Nordmann AJ, Suter-Zimmermann K, Bucher HC, Shai I, Tuttle KR, Estruch R, *et al*. Meta-Analysis Comparing Mediterranean to Low-Fat Diets for Modification of Cardiovascular Risk Factors. The American Journal of Medicine. 2011; 124: 841–851.e2.
51. Nissensohn M, Román-Viñas B, Sánchez-Villegas A, Piscopo S, Serra-Majem L. The Effect of the Mediterranean Diet on Hypertension: a Systematic Review and Meta-Analysis. Journal of Nutrition Education and Behavior. 2016; 48: 42–53.e1.
52. Rees K, Takeda A, Martin N, Ellis L, Wijesekara D, Vepa A, *et al*. Mediterranean-style diet for the primary and secondary prevention of cardiovascular disease. Cochrane Database of Systematic Reviews. 2019; 3: CD009825.
53. Cowell OR, Mistry N, Deighton K, Matu J, Griffiths A, Minihane AM, *et al*. Effects of a Mediterranean diet on blood pressure: a systematic review and meta-analysis of randomized controlled trials and observational studies. Journal of Hypertension. 2021; 39: 729–739.
54. Merino J, Guasch-Ferré M, Martínez-González MA, Corella D, Estruch R, Fitó M, *et al*. Is complying with the recommendations of sodium intake beneficial for health in individuals at high cardiovascular risk? Findings from the PREDIMED study. The American Journal of Clinical Nutrition. 2015; 101: 440–448.
55. 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: 235–244.