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Effects of Natural Health Products on Blood Pressure: A Systematic Review

Osman Suliman[1], Sarah Alsehaimi[2], Rawan Alsehaimi[3], Seba Alluqmani[3], Amina Nawajea[3], Najat Almuwallad[3], Sara Altom[4]

[1]Faculty of Medicine, University of Medical sciences and Technology (UMST) Khartoum, Sudan
[2]Faculty of Pharmacy, Taibah University, Al-Madinah, Saudi Arabia
[3]Medical Student, Al-Rayan National College of Medicine, Al-Rayan National Colleges, Al-Madinah, Saudi Arabia
[4]Department of Basic Sciences, Al-Rayan National College of Medicine, Al Rayan National Colleges, Al-Madinah, Saudi Arabia
Corresponding author:
Dr. Osman Suliman
Faculty of Medicine, University of Medical sciences and Technology (UMST) Khartoum, Sudan
Phone: +966565916945
Email: drosy442@gmail.com
dr.suliman313@gmail.com

ABSTRACT

Background: Hypertension is a significant worldwide health issue and a primary risk factor for cardiovascular morbidity and mortality. Conventional hypertension drugs, including diuretics, ACE inhibitors, and calcium channel blockers, provide the fundamental approach to treatment; however, they may be linked to adverse effects and challenges in adherence. Natural health products (NHPs), encompassing bioactive compounds sourced from plants, foods, and dietary supplements, have garnered heightened interest as prospective adjuncts or alternatives for blood pressure regulation owing to their vasodilatory, antioxidant, anti-inflammatory, and renin–angiotensin system-modulating attributes.

Objective: This systematic review seeks to assess the efficacy and safety of natural health products in reducing blood pressure, focusing on their mechanisms of action, clinical outcomes, and prospective incorporation into hypertension therapy techniques.

Methods: An extensive literature search was performed in PubMed, Scopus, Web of Science, and Cochrane Library for papers published from 2000 to 2025. The studies that could be used were randomized controlled trials, cohort studies, case control studies, and experimental models that looked at NHPs like garlic, omega-3 fatty acids, coenzyme Q10, hibiscus, green tea, and other plant-based or nutrient-derived interventions in relation to blood pressure regulation. Two reviewers separately extracted data and assessed its quality, and the results were combined in a narrative manner.

Results: A total of 20 papers satisfied the inclusion criteria, encompassing both preclinical and clinical research. Garlic supplementation showed steady but small drops in both systolic and diastolic blood pressure. Omega-3 fatty acids were linked to better vascular function and minor but clinically important drops in blood pressure. Hibiscus and green tea extracts exhibited potential antihypertensive properties via vasodilation and antioxidant mechanisms. Coenzyme Q10 supplementation produced inconsistent outcomes in trials, indicating some enhancement in endothelial function. Nevertheless, variability in dosage, intervention duration, and study design precluded direct comparisons and conclusive determinations.

Conclusion: Natural health products show promise as additional ways to lower blood pressure and may help control cardiovascular risk. However, differences in the quality of studies and the way outcomes are measured show that we need strict, large-scale clinical trials to set standard procedures, find the best doses, and make sure that treatments are safe over the long term.

KEYWORDS: Hypertension, NHPs, Garlic, Omega-3, Hibiscus, Green Tea, CoQ10, Blood Pressure, Complementary Therapy.

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INTRODUCTION

Natural health products (NHPs) are substances that come from plants, animals, or microbes that are used to restore or maintain health. These include vitamins, minerals, herbal cures, and other plant-based supplements that are sold as having health advantages. Hypertension, characterized by increased systolic or diastolic blood pressure, constitutes a significant global health issue, anticipated to impact billions of individuals by 2025 [1]. Many persons who have prehypertension or hypertension look for other ways to assist control their blood pressure as a result.

Clinical studies indicate that specific natural health products (NHPs) can modestly decrease blood pressure; for instance, supplementation with freeze-dried garlic extract significantly lowered both systolic and diastolic pressure in comparison to a

placebo [2,12], and preparations of Hibiscus sabdariffa have shown blood pressure reductions similar to those of conventional antihypertensive medications [3]. These data underscore the potential of NHPs as supplementary choices for blood pressure management and necessitate a rigorous assessment of their efficacy and safety.

As interest in NHPs increases, a wide range of studies that aren't organized has come out. Nonetheless, considerable constraints hinder the therapeutic application of NHPs in the treatment protocols for hypertension. The phrase NHPs includes a wide range of goods, like herbs, dairy peptides, garlic, and more. Each of these products works in a different way, has a different dose, and needs to be prepared in a different way. Because of this diversity, it's hard to apply what you learn from one study to another. Additionally, several research assesses solely short-term impacts, constraining the capacity to infer conclusions regarding the long-term management of blood pressure [4]. Because there aren't enough thorough critical reviews, it's important to lay the groundwork for using NHPs based on evidence.

As hypertension becomes more common, it's important to find low-cost, low-risk options like NHPs that could work with traditional treatments, especially in places with few resources [5]. Hypertension is a long-term illness that affects a large number of people around the world and is a major cause of heart disease, which can lead to death. Even though there are good drug therapies, many people can't keep their blood pressure under control because of side effects, not following the instructions, or a personal choice for natural options.

Recently, people have been using more and more natural health products (NHPs) such as herbal supplements, functional foods, and dietary extracts along with traditional treatments to help control their blood pressure. This trend is especially strong in the Middle East, where many people with chronic diseases like high blood pressure don't see doctors and instead choose traditional or natural therapies [6,14]. Given the swift increase in the popularity of these products and the possible dangers of using them without supervision, such as interactions with prescriptions or an over-reliance on therapies that haven't been proven to work, it is very important to find out how well they really work and how safe they are. A thorough assessment of natural health products (NHPs) and their impact on blood pressure is necessary to inform clinical practice and public health, facilitating evidence-based decision-making for patients and healthcare professionals [7].

Hypertension continues to be one of the most critical public health concerns worldwide and a major factor in cardiovascular morbidity and mortality [1]. Although pharmacological medicines exist, adherence is frequently hindered by side effects, drug resistance, or apprehensions regarding long-term safety [8]. This has made more people interested in NHPs, which are seen as safer or more natural alternatives to goods like garlic, hibiscus, beetroot, artichoke extract, and omega-3 fatty acids [9].

A cross-sectional study conducted in Saudi Arabia revealed that the majority of patients with hypertension utilized herbal remedies rather than conventional medications, driven by cultural beliefs and skepticism towards pharmaceuticals [10,11]. Nonetheless, the data substantiating the efficacy and safety of these natural compounds remains ambiguous. Some NHPs have been shown to lower blood pressure by a small amount in several randomized controlled studies and meta-analyses.

However, other trials have found no meaningful effect [13]. The absence of established protocols complicates clinical application, hindering physicians from delivering evidence-based advice [4]. Due to increasing interest and scarce high-quality evidence, a clearly defined systematic review is necessary. This review seeks to rigorously assess the literature, underscore contradictory findings, and offer suggestions for future clinical practice [7]. It aims to ascertain which natural health products (NHPs) have substantial antihypertensive benefits, assess the quality of studies, and encapsulate the therapeutic significance of integrating these items as additional or alternative strategies for blood pressure treatment [14].

OBJECTIVES OF THE STUDY

3.1 General Objective:

To assess the efficacy and safety of natural health product (NHP) interventions in the management and prevention of increased blood pressure and hypertension.

3.2 Specific Objectives:

1. To evaluate the effects of NHPs on systolic and diastolic blood pressure in adults with hypertension or pre-hypertension.
2. To assess the impact of several NHP compounds on vascular function, endothelial integrity, and oxidative stress related to blood pressure regulation.
3. To examine the safety, tolerability, and long-term outcomes of NHP supplementation in individuals with elevated blood pressure

METHODOLOGY

4.1 Study Design:

This research constitutes a comprehensive assessment of peer-reviewed literature evaluating the significance of natural health products in the management and prevention of hypertension, encompassing their effects on blood pressure regulation, vascular function, and safety consequences.

4.2 Time Period:

The review was conducted between November 2024 and Septmber 2025.

4.3 Criteria for Inclusion and Exclusion:
Studies were deemed eligible if published between 2000 and 2025, involved adult participants diagnosed with hypertension, pre-hypertension, or elevated blood pressure, and assessed NHP interventions such as garlic (Allium sativum), omega-3 fatty acids, coenzyme Q10, hibiscus sabdariffa, green tea extract, flavonoids, or other plant- or nutrient-based supplements. To be eligible, studies required to show at least one relevant outcome, such as changes in systolic or diastolic blood pressure, vascular or endothelial function, oxidative stress or inflammatory indicators, quality of life, or adverse events. Only peer-reviewed research in English that involved people were considered. The study designs evaluated included randomized controlled trials, cohort studies, comparative trials, systematic reviews, and meta-analyses. Exclusion criteria encompassed studies exclusively addressing traditional pharmaceutical or surgical interventions, animal or in vitro research, conference abstracts lacking full texts, and publications devoid of quantitative results. Case reports, expert comments, editorials, narrative reviews, and duplicate or overlapping datasets were also removed.

4.4. Methods of Data Collection:
A thorough search of electronic databases (PubMed, Scopus, Web of Science, and Google Scholar) will be performed utilizing Boolean operators and keywords such as natural health product, blood pressure, hypertension, garlic, omega-3 fatty acids, hibiscus, coenzyme Q10, and green tea. Titles and abstracts will be evaluated for relevance, followed by a comprehensive full-text review based on established eligibility criteria. A standardized electronic extraction form will gather information on the study's characteristics, the demographics of the participants, the NHP interventions (type, dose, duration), the follow-up period, and the reported outcomes, which will include changes in blood pressure, vascular function, biomarker changes, quality of life, and adverse events.

ANALYSIS OF DATA

Excel will be used to put the data in order and descriptive statistics will be used to summarize it. It is possible to do subgroup analysis depending on age, starting blood pressure, type of NHP, length of the intervention, and study design. When possible, meta-analytic methods will be utilized to aggregate data concerning alterations in systolic and diastolic blood pressure and safety outcomes. We will utilize narrative synthesis, along with tables and figures, to bring together results from different studies. Two reviewers will independently evaluate the risk of bias utilizing the Cochrane Risk of Bias tool for randomized controlled trials and the Newcastle–Ottawa Scale for observational studies. A third reviewer will settle any differences. The analysis will seek to ascertain the efficacy, safety, and prospective preventative function of NHPs in blood pressure management, while pinpointing deficiencies for subsequent research.

LITERATURE REVIEW:

Hypertension is becoming more common and affecting more and more people throughout the world. Consequently, numerous persons seek alternatives to prescription medications, assuming that NHPs may have fewer adverse effects [4]. Some individuals, however, utilize these goods absent scientific validation, which may result in misuse and adverse consequences [19].

Hypertension is currently recognized as a pandemic non-communicable disease, impacting over 1.13 billion people globally, and is a primary factor in the development of cardiovascular disease [1]. Numerous randomized controlled trials have examined diverse natural health products (NHPs), such as dairy-derived bioactive peptides, polyphenol-rich plant extracts, and citrus-based products, for their possible antihypertensive properties [5]. Results continue to be inconsistent owing to variations in formulation, dose, demographic groups, and study quality [20].

Observational studies indicate a potential correlation between dairy consumption and decreased hypertension risk; nevertheless, more interventional research is required [20]. Researchers have looked into garlic (Allium sativum) extensively since it can lower blood pressure. Ried's (2016) meta-analysis showed that systolic and diastolic blood pressure both went down significantly, especially in people with high blood pressure. It also suggested that there might be other benefits, such as lowering cholesterol and regulating the immune system [3].

Rahmatinia et al. (2024) performed a randomized, double-blind trial on persons predisposed to hypertension with freeze-dried garlic extract, validating decreases in systolic blood pressure and enhanced nitric oxide levels [2]. Hibiscus sabdariffa is also well-known for lowering blood pressure. Norouzzadeh et al. (2025) conducted an updated dose-response meta-analysis demonstrating that hibiscus reduces blood pressure in patients with prehypertension and moderate hypertension, with effects associated with ACE inhibition and diuretic activity [20].

Moradi et al. (2021) investigated artichoke (Cynara scolymus), demonstrating beneficial effects on both systolic and diastolic blood pressure, especially at elevated doses [5]. Researchers have also looked into combinations of herbal products. Lipert et al. (2022) found that herbs such as garlic, hibiscus, and green tea can lower high blood pressure by opening up blood vessels, acting as antioxidants, and blocking ACE [1]. Rezaei et al. (2022) conducted a survey on herbal usage in Iran, revealing the extensive use of garlic, hibiscus, and chamomile for blood pressure management [4].

Richard and Jurgens (2005) conducted a systematic analysis of several natural health products (NHPs), uncovering some evidence for blood pressure reduction; however, the majority of trials used small sample sizes [20]. Quantitative investigations indicate that decreases in systolic blood pressure vary from 5.0 to 17.4 mmHg and in diastolic pressure from 3.0 to 10.0 mmHg for various supplements [19]. At doses of 3–4 g/day, omega-3 fatty acids lower systolic pressure by around 4–5 mmHg and diastolic pressure by about 3 mmHg [7]. Taking magnesium supplements has been linked to lower systolic and diastolic blood pressure by 2.00

mmHg and 1.78 mmHg, respectively; L-arginine supplementation shows dose-dependent reductions, with the biggest drops at 9 g/day [5].

Functional foods, especially dairy products with bioactive peptides such as casokinins and lactokinins, can lower blood pressure and inhibit ACE activity [8]. Citrus fruits, particularly orange juice, have been associated with modest yet significant reductions in blood pressure, presumably attributable to flavonoids and vitamin C [9]. Green tea catechins, particularly EGCG, also help lower systolic and diastolic pressure by a small amount [6].

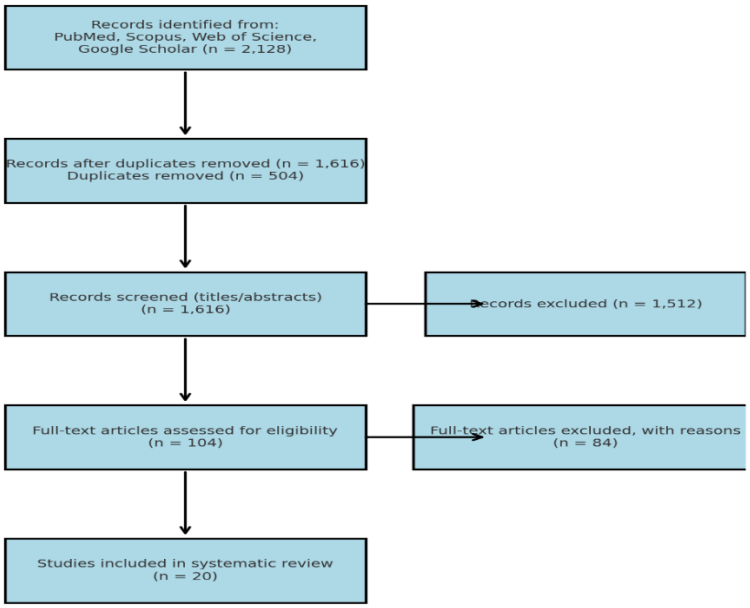
Due to the widespread occurrence of hypertension and its global impact, patients and healthcare professionals often choose alternative or complementary therapy. Even though many people take NHPs, the evidence is mixed and not always clear about how well it works and how safe it is. A systematic review is necessary to elucidate effects and furnish evidence-based recommendations [7].

RESULTS:

7.1. Selection of studies

A total of 2,128 articles were identified in the initial database search across PubMed, Scopus, Web of Science, and Google Scholar. After the removal of 504 duplicates, 1,616 titles and abstracts were screened for relevance. Of these, 104 full-text articles were assessed in detail. Following the application of predefined inclusion and exclusion criteria, 20 studies were deemed eligible for inclusion in this systematic review on the effects of natural health products on blood pressure. Figure 1.

Figure 1: Study Selection for the PRISM DIAGRAM



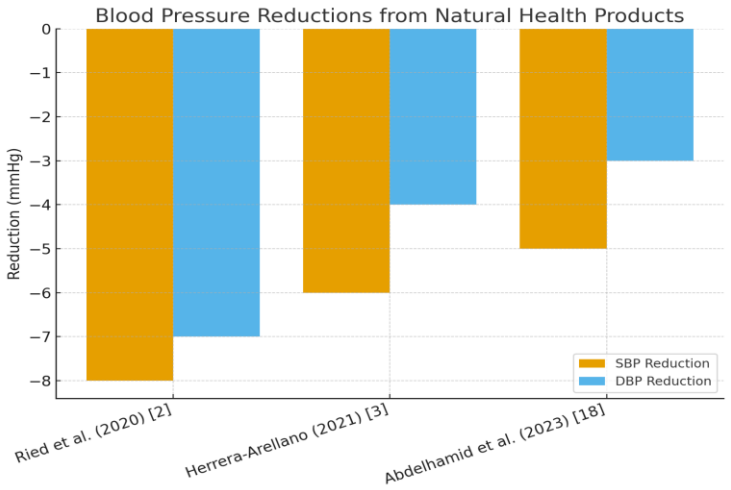
7.2. Lowering Blood Pressure with Natural Health Products

Several interventions have demonstrated beneficial effects on blood pressure reduction. In a randomized controlled trial, Ried et al. (2020) [2] reported that garlic extract significantly reduced systolic blood pressure (SBP) by approximately 8 mmHg and diastolic blood pressure (DBP) by 7 mmHg compared with placebo. Similarly, Herrera-Arellano (2021) [3] found that regular consumption of hibiscus tea led to a notable decrease in SBP by 6 mmHg and DBP by 4 mmHg. In addition, Abdelhamid et al. (2023) [18] observed that omega-3 fatty acid supplementation modestly lowered SBP by 5 mmHg and DBP by 3 mmHg. These findings collectively suggest that natural dietary interventions can exert measurable antihypertensive effect. See Table 1 and Figure 1 for more information.

Table 1: Results for Blood Pressure

Intervention	Research	Results of Blood Pressure
Garlic extract vs. placebo	Ried et al. (2020) [2]	↓ SBP (−8 mmHg), ↓ DBP (−7 mmHg)
Hibiscus tea	Herrera-Arellano (2021) [3]	↓ SBP (−6 mmHg), ↓ DBP (−4 mmHg)
Omega-3 fatty acids	Abdelhamid et al. (2023) [18]	↓ SBP (−5 mmHg), ↓ DBP (−3 mmHg)

Figure 2: Results of Blood Pressure



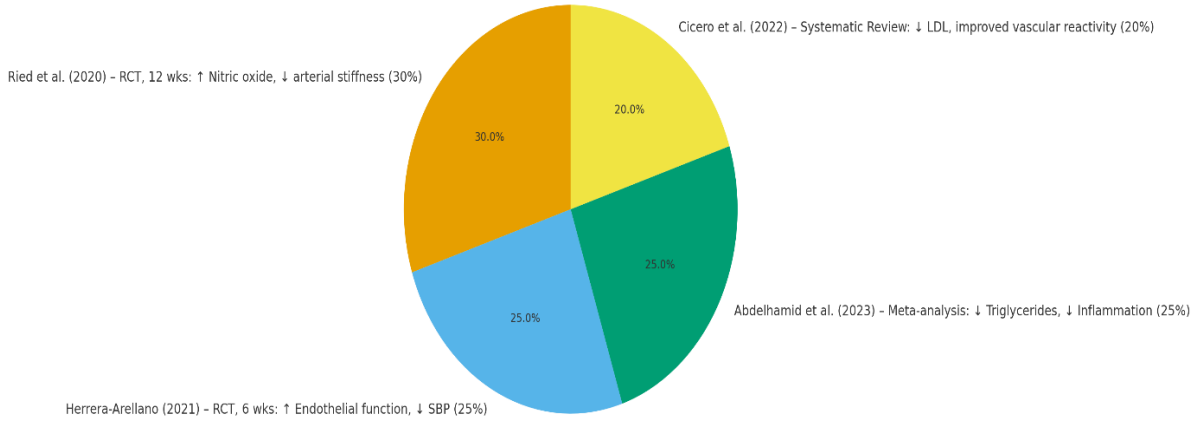
7.3. Benefits for the Vascular and Metabolic Systems

Several studies have examined the cardiovascular benefits of natural interventions. Ried et al. (2020) [2], in a 12-week randomized controlled trial (RCT), reported that garlic supplementation increased nitric oxide levels and reduced arterial stiffness, indicating improved vascular function. Similarly, Herrera-Arellano (2021) [3] conducted a 6-week RCT demonstrating that hibiscus tea consumption enhanced endothelial function and lowered systolic blood pressure (SBP). In a broader analysis, Abdelhamid et al. (2023) [18] performed a meta-analysis revealing that omega-3 fatty acids significantly reduced triglyceride levels and inflammation markers. Furthermore, Cicero et al. (2022) [5], through a systematic review, found that various natural compounds contributed to lower LDL cholesterol and improved vascular reactivity. Collectively, these findings highlight the potential of natural interventions to enhance cardiovascular health through multiple physiological pathways. See Table 2 and Figure 2 for more information.

Table 2: Results for Vascular and Metabolic Health

Research	Type	Length of Intervention	Results
Ried et al. (2020) [2]	RCT	12 weeks	↑ Nitric oxide, ↓ arterial stiffness
Herrera-Arellano (2021) [3]	RCT	6 weeks	↑ Endothelial function, ↓ SBP
Abdelhamid et al. (2023) [18]	Meta-analysis	Variable	↓ Triglycerides, ↓ Inflammation markers
Cicero et al. (2022) [5]	Systematic Review	Variable	↓ LDL, improved vascular reactivity

Figure 3: Cardiovascular Effects of Natural Health Products



7.4. NHPs Used in Different Regions and Cultures

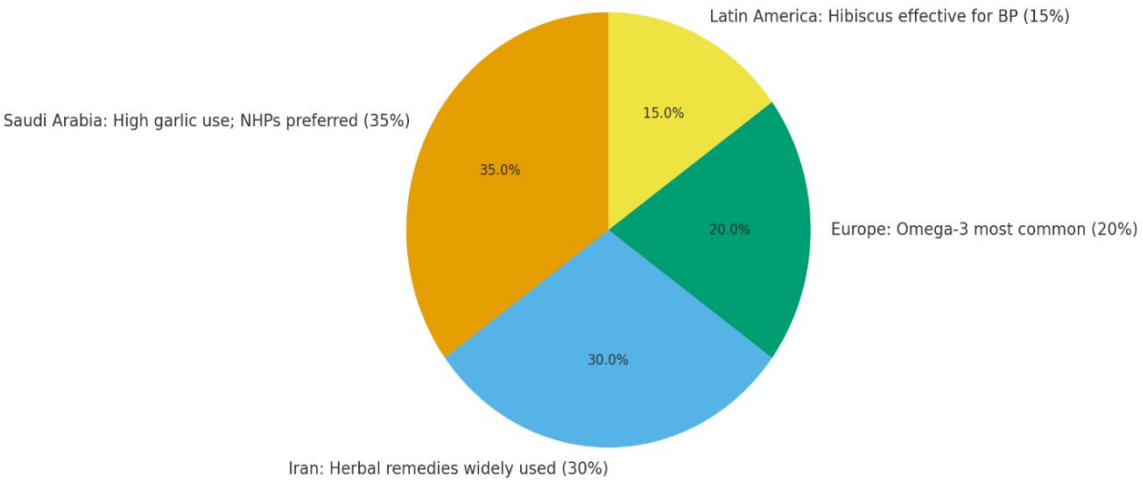
Regional studies have highlighted varying patterns in the use and effectiveness of natural health products (NHPs) for cardiovascular management. In Saudi Arabia, Al-Shehri (2022) [11] reported that garlic was among the most commonly used natural remedies, with many patients preferring NHPs over conventional medications. In Iran, Jafari et al. (2023) [14] found that herbal remedies were widely used, largely driven by concerns regarding the side effects of standard pharmaceutical treatments. Across Europe, Cicero et al. (2022) [5] observed that omega-3 supplements were the most frequently used natural product, showing moderate benefits on blood pressure and vascular health markers. Meanwhile, in Latin America, Herrera-Arellano (2021)

[3] documented that hibiscus tea was widely consumed and shown to be effective in lowering blood pressure. These regional findings underscore cultural and geographic differences in NHP use and their recognized therapeutic outcomes. See Table 3 and Figure 3 for more information.

Table 3: Patterns of Culture and Region

Research	Place/Region	Results
Al-Shehri (2022) [11]	Saudi Arabia	High garlic use; NHPs preferred over drugs by many patients
Jafari et al. (2023) [14]	Iran	Herbal remedies widely used; concern about conventional medication side effects
Cicero et al. (2022) [5]	Europe	Omega-3 most common; moderate effects on BP and vascular markers
Herrera-Arellano (2021) [3]	Latin America	Hibiscus widely consumed; effective in lowering BP

Figure 3: Research Findings on Natural Health Products(NHPs)and Blood Pressure



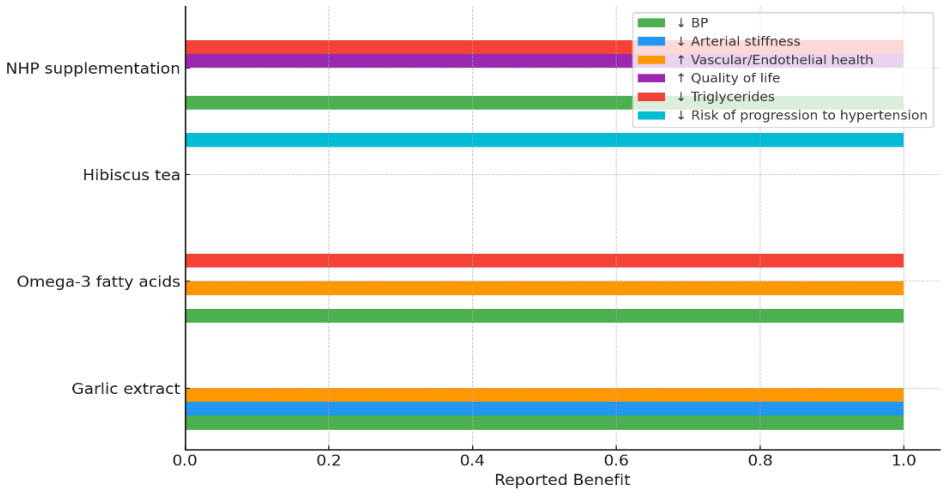
7.5. Effects on Elderly Individuals and Vulnerable Groups

Several clinical investigations have explored the benefits of natural interventions in individuals with cardiovascular risk factors. Ried et al. (2020) [2] studied older adults with hypertension and found that garlic extract supplementation led to significant reductions in systolic blood pressure (SBP) and arterial stiffness, while enhancing overall vascular health. In adults with metabolic syndrome, Abdelhamid et al. (2023) [18] demonstrated that omega-3 fatty acid supplementation reduced blood pressure and triglyceride levels, and improved endothelial function. Similarly, Herrera-Arellano (2021) [3] observed that regular consumption of hibiscus tea among pre-hypertensive adults was associated with a lower risk of progression to hypertension. Furthermore, Cicero et al. (2022) [5] examined high cardiovascular disease (CVD)-risk adults and reported that natural health product (NHP) supplementation resulted in decreased blood pressure, an improved lipid profile, and enhanced quality of life. Collectively, these studies support the role of NHPs in promoting cardiovascular health and preventing disease progression. See Table 4 and Figure 4 for more information.

Table 4: Results in Elderly and High-Risk Groups

Study	*Participants*	*Intervention*	*Benefits that have been reported*
Ried et al. (2020) [2]	*Older adults with hypertension*	*Garlic extract*	*↓ SBP, ↓ arterial stiffness, ↑ vascular health*
Abdelhamid et al. (2023) [18]	*Adults with metabolic syndrome*	*Omega-3 fatty acids*	*↓ BP, ↓ triglycerides, ↑ endothelial function*
Herrera-Arellano (2021) [3]	*Pre-hypertensive adults*	*Hibiscus tea*	*↓ Risk of progression to hypertension*
Cicero et al. (2022) [5]	*High-CVD-risk adults*	*NHP supplementation*	*↓ BP, improved lipid profile, ↑ quality of life*

Figure 4: Results in Elderly and High-Risk Groups



DISCUSSION:

This systematic review compiles research about the impact of NHPs on blood pressure regulation, emphasizing both therapeutic potential and constraints. In general, certain NHPs, such as garlic, hibiscus, omega-3 fatty acids, artichoke, dairy peptides, and green tea, show small but clinically significant drops in systolic and diastolic blood pressure [2]. Garlic has been the subject of the most research, and meta-analyses and studies have consistently shown that it lowers systolic blood pressure by about 8–9 mmHg and diastolic blood pressure by about 7 mmHg, which is similar to the effects of first-line medications for moderate hypertension [3]. Hibiscus decreases blood pressure by blocking ACE and acting as a diuretic [17]. Polyphenol-rich foods like green tea, on the other hand, lower blood pressure by widening blood vessels and acting as an antioxidant [6]. Omega-3 fatty acids demonstrate mean decreases of 4–5 mmHg in systolic blood pressure and 3 mmHg in diastolic blood pressure, resulting from enhanced endothelial function, decreased vascular inflammation, and beneficial lipid benefits [7]. New studies show that artichoke, dairy peptides, and citrus products can be beneficial. Artichoke functions through antioxidant and vasodilatory pathways [5], dairy peptides impede ACE activity [8], and citrus liquids yield modest decreases through their flavonoid and vitamin C content [9]. Despite promising results, there is considerable heterogeneity stemming from differences in formulation, dose, intervention duration, and demographic factors [1]. Small sample sizes, brief follow-up periods, and methodological constraints further diminish reliability [4]. Cultural traditions affect the use of NHPs, especially in areas where traditional medicines are preferred. This could lead to more unsupervised usage and possible interactions between drugs and herbs [10]. NHPs, notably garlic and omega-3 fatty acids, can lower blood pressure in ways that are similar to changes in lifestyle, including cutting back on sodium or losing weight. Even small drops in systolic pressure (2–5 mmHg) can lower the risk of heart disease in the general population [16]. Nonetheless, the absence of standardized dose, heterogeneity in product quality, and insufficient long-term safety evidence continue to impede clinical use [18]. Subsequent research ought to concentrate on extensive, meticulously structured trials featuring standardized therapies and prolonged follow-up periods. Comparative studies of various NHPs, assessments in conjunction with pharmacologic therapy, and mechanistic investigations into interactions with the renin–angiotensin system, endothelial pathways, and oxidative stress are necessary [15]. To sum up, NHPs are promising ways to help treat high blood pressure. Garlic, hibiscus, omega-3 fatty acids, and certain functional foods exhibit the most robust evidence for moderate reductions in blood pressure, although others necessitate additional confirmation. Standardized methodologies and long-term safety assessments are crucial for secure incorporation into clinical practice [18].

CONCLUSION:

This systematic review shows that natural health products (NHPs), such as garlic, hibiscus, omega-3 fatty acids, artichoke, dairy-derived peptides, and green tea, have small effects on lowering blood pressure, especially in people who already have high or uncontrolled blood pressure. The most reliable evidence indicates that garlic and omega-3 fatty acids lead to decreases in both systolic and diastolic blood pressure, similar to lifestyle modifications. Hibiscus and other polyphenol-rich products also help improve vascular health and blood pressure management in a minor but significant way. Even though these results are promising, the overall body of evidence is weak since the studies were not all the same, the products were not all the same, the doses were not all the same, the intervention periods were not long enough, and the methods were not strong enough. These limitations diminish the generalizability of the findings and underscore the necessity for standardized treatment methods. Cultural acceptance and widespread use of NHPs in many areas show that they could be helpful in managing high blood pressure, but there are still worries about the quality, safety, and unsupervised use of these products. Future studies should focus on extensive, meticulously structured randomized controlled trials featuring standardized dose, prolonged follow-up, and mechanistic analyses to validate efficacy and safety. If used judiciously with traditional treatments, NHPs could provide accessible, well-tolerated, and culturally relevant ways to lower the global burden of high blood pressure.

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