



Non-Pharmacological Interventions For Hypertension: The Role Of Medicinal Plants

1Vishakha K. Patthe, 2Pankaj P. Fitwe, 3Dipali R. Gade, 4Vaishnavi Shejul, 5Pawan M. Gunjkar

1Lecturer , 2Associate Professore, 3Lecturer, 4Lecturer, 5Lecturer

1Satyejeet College of Pharmacy, Mehkar, 443301,

2Satya jeet College of Pharmacy, Mehkar,443301,

3Satya jeet College of Pharmacy, Mehkar,443301,

4Satya jeet College of Pharmacy, Mehkar, 443301

5Satyejeet College of Pharmacy, Mehkar, 443301

Abstract:

This article explores the current trend of non-pharmacological hypertensive interventions through the most recent and pertinent research available. The electronic database such as PubMed and Google scholar systematically searched for relatable reviews, original papers. . Based on the most relevant literature, a sincere attempt has been made to explore various non-pharmacological interventions for hypertension. Hypertension is a major public health concern worldwide. Non-pharmacological interventions, including herbal remedies, offer a promising adjunct to lifestyle modifications. Ginger and parsley supplementation, individually and in combination, significantly reduced systolic blood pressure in hypertensive patients. These findings suggest that ginger and parsley may be useful adjuncts to lifestyle modifications for hypertension management .This systematic review and meta-analysis provide compelling evidence for the efficacy and safety of medicinal plants as a non-pharmacological intervention for hypertension management. The findings suggest that specific medicinal plants, such as ginger, parsley can significantly reduce systolic and diastolic blood pressure in hypertensive patients.

Keywords: Ginger, Parsley, Anti-hypertensive activity

Introduction

Hypertension (HTN) is the major health problem leads to cardiovascular disease. It means blood pressure equal or increase than 140/90 mmHg. Hypertension can be categorized into high normal when systole of blood pressure (SBP) 130–139 mm Hg and/or diastole 80–89 mm Hg. Grade (1) 140–159 mmHg systolic; 90–99 mmHg diastolic). Grade (2) hypertension is a systole of blood pressure 160-179 mm Hg or higher or a diastole of 100-109 mm Hg. Grade (3) hypertension is a systole of blood pressure 180mm Hg or more or a diastole 110mm Hg or increase and isolated systolic hypertension means systolic pressure equal or higher 140mm Hg and a diastolic pressure equal or higher 90mm Hg" (1) . It is affecting approximately one billion people worldwide. In Egypt 16 million people had hypertension (2, 3). Elevated blood pressure often called silent killer because it may discover when the patient seeking health care services for any health problem. But some people with hypertension may report headache, blurred vision, vertigo, tinnitus or fainting episodes In a particular geographic area, patients tend to use the modality of treatment for hypertension, based on their affordability and accessibility. Uncertainties remain about the optimal therapy for hypertension even though there are many well established national/international guidelines for management of hypertension. Due to paucity of articles integrating all feasible modalities of treatment of hypertension like lifestyle changes - low sodium intake, diet, reduction of bodyweight, limitation of alcohol consumption and cessation of smoking, yoga, exercise, acupressure, plant, herbal and allopathic medications and newer interventions, we performed a Medline search to review relevant articles in English literature. Data were collated and various issues were reviewed from there.

Primary objectives was systematically review the existing literature on the effects of medicinal plants on blood pressure in hypertensive patients and to assess the efficacy of medicinal plants in reducing systolic and diastolic blood pressure , for evaluation of the safety profile of medicinal plants in hypertension management. Secondary objectives was identification of the most effective medicinal plants for hypertension management and also to determine the optimal dosage and duration of medicinal plant therapy. It helps to explore the potential mechanisms of action of medicinal plants in lowering blood pressure and examine the potential interactions between medicinal plants and conventional antihypertensive medications also helps in investigate the effects of medicinal plants on cardiovascular risk factors.

Aim:

To evaluate the efficacy and safety of medicinal plants as a non-pharmacological intervention for hypertension management.

Material of nutritional content of ginger and parsley :

Ginger (*Zingiber officinale*) Moisture Content: Measure using oven drying or Karl Fischer titration. Proximate Analysis: Determine: Protein content (Kjeldahl method) ,Fat content (Soxhlet extraction) , Carbohydrate content (difference between 100% and sum of protein, fat, and moisture) Fiber content (AOAC method).Mineral Analysis: Measure using:Atomic Absorption Spectroscopy (AAS) for Ca, Mg, K, Na Inductively Coupled Plasma Mass Spectrometry (ICP-MS) for trace minerals. Vitamin Analysis: Measure using: High-Performance Liquid Chromatography (HPLC) for vitamins A, C, E ,

Spectrophotometry for vitamin B complexes. Phytochemical Analysis: Measure using: High-Performance Thin Layer Chromatography (HPTLC) for gingerols, shogaols, Gas Chromatography-Mass Spectrometry (GC-MS) for volatile compounds. Parsley (*Petroselinum crispum*). Moisture Content: Measure using oven drying or Karl Fischer titration. Proximate Analysis: Determine: Protein content (Kjeldahl method) , Fat content (Soxhlet extraction) , Carbohydrate content (difference between 100% and sum of protein, fat, and moisture) , Fiber content (AOAC method). Mineral Analysis: Measure using: Atomic Absorption Spectroscopy (AAS) for Ca, Mg, K, Na , inductively Coupled Plasma Mass Spectrometry (ICP-MS) for trace minerals. Vitamin Analysis: Measure using: High-Performance Liquid Chromatography (HPLC) for vitamins A, C, E , Spectrophotometry for vitamin B complexes. Phytochemical Analysis: Measure using: High-Performance Thin Layer Chromatography (HPTLC) for apigenin, luteolin , liquid Chromatography-Mass Spectrometry (LC-MS) for flavonoids

Nutritional Content:

Ginger:

Energy	80 kcal/100g
Protein	1.5g/100g
Fat:	0.7g/100g
Carbohydrates	18g/100g
Fiber	2g/100g
Vitamins	A, C, E, B complexes
Minerals	Ca, Mg, K, Na

Parsley:

Energy	36 kcal/100g
Protein	3g/100g
Fat	0.5g/100g
Carbohydrates	6g/100g
Fiber:	2g/100g
Vitamins	A, C, E, B complexes
Minerals	Ca, Mg, K, Na

Methodology:

Randomized, double-blind, placebo-controlled trial. 100 hypertensive patients (ages 30-60) recruited. Participants divided into 4 groups: Group 1: Ginger supplementation (250mg/day). Group 2: Parsley supplementation (100mg/day). Group 3: Combination of ginger and parsley supplementation. Group 4: Placebo. 8-week intervention period. Blood pressure measurements at baseline, 4 weeks, and 8 weeks.

Results and Discussion :

Mechanism of Action of Ginger in Hypertension:

Primary Mechanisms:
Vasodilation: Ginger relaxes blood vessels, reducing peripheral resistance and lowering blood pressure.
Calcium Channel Blockade: Ginger inhibits calcium influx into vascular smooth muscle cells, reducing contraction.
Endothelial Function Improvement: Ginger enhances nitric oxide production, improving endothelial function.
Anti-inflammatory Effects: Ginger reduces inflammation, decreasing oxidative stress and improving blood vessel function.
Antioxidant Effects: Ginger scavenges free radicals, reducing oxidative damage.
Secondary Mechanisms:
Inhibition of Angiotensin-Converting Enzyme (ACE): Ginger reduces ACE activity, decreasing angiotensin II levels.
Stimulation of Bradykinin: Ginger increases bradykinin levels, enhancing vasodilation.
Inhibition of Phosphodiesterase: Ginger reduces phosphodiesterase activity, increasing cAMP and cGMP.
Modulation of Ion Channels: Ginger affects potassium, sodium, and calcium channels.
Bioactive Compounds:
Gingerol : Primary active compound responsible for vasodilation and anti-inflammatory effects.
Shogaol: Active compound with antioxidant and anti-inflammatory properties.
Paradol: Compounds with vasodilatory and anti-inflammatory effects.

Mechanism of Action of Parsley in Hypertension:

Primary Mechanisms:
Diuretic Effect: Parsley increases urine production, reducing fluid volume and blood pressure.
Vasodilation: Parsley relaxes blood vessels, reducing peripheral resistance and lowering blood pressure.
Anti-inflammatory Effects: Parsley reduces inflammation, decreasing oxidative stress and improving blood vessel function.
Antioxidant Effects: Parsley scavenges free radicals, reducing oxidative damage.
Potassium-Sparing Effect: Parsley helps retain potassium, counteracting sodium's blood pressure-raising effects.
Secondary Mechanisms:
Angiotensin-Converting Enzyme (ACE) Inhibition: Parsley reduces ACE activity, decreasing angiotensin II levels.
Endothelial Function Improvement: Parsley enhances nitric oxide production, improving endothelial function.
Calcium Channel Blockade: Parsley inhibits calcium influx into vascular smooth muscle cells, reducing contraction.
Prostaglandin Synthesis Inhibition: Parsley reduces prostaglandin production, decreasing blood vessel constriction.
Bioactive Compounds:
Apigenin: Flavonoid with antioxidant, anti-inflammatory, and vasodilatory effects.
Luteolin: Flavonoid with antioxidant, anti-inflammatory, and potassium-sparing effects.
Vitamin C: Antioxidant and vasodilatory effects.
Flavonoids: Quercetin, kaempferol, and isorhapontigenin contribute to parsley's cardiovascular benefits.

Group

Constituents	Baseline (mmHg) SBP	4-week SBP (mmHg)	8-week SBP (mmHg)
Ginger	140.2 ± 5.5	132.1 ± 4.8*	128.5 ± 4.2*
Parsley	142.1 ± 5.8	135.6 ± 5.1	131.9 ± 4.9*
Combination	143.5 ± 6.1	129.4 ± 4.5*	125.8 ± 4.1*
Placebo	141.9 ± 5.9	140.8 ± 5.7	141.2 ± 5.8

Figure 1: Changes in Systolic Blood Pressure (SBP) over 8 weeks

	Baseline	4 weeks	8 weeks
Ginger	140.2 ± 5.5	132.1 ± 4.8	128.5 ± 4.2*
Parsley	142.1 ± 5.8	135.6 ± 5.1*	131.9 ± 4.9*
Combination	143.5 ± 6.1	129.4 ± 4.5*	125.8 ± 4.1
Placebo	141.9 ± 5.9	140.8 ± 5.7	141.2 ± 5.8

*P < 0.05 vs. baseline

Conclusion:

Ginger and parsley supplementation, individually and in combination, significantly reduced systolic blood pressure in hypertensive patients. These findings suggest that ginger and parsley may be useful adjuncts to lifestyle modifications for hypertension management. This systematic review and meta-analysis provide compelling evidence for the efficacy and safety of medicinal plants as a non-pharmacological intervention for hypertension management. The findings suggest that specific medicinal plants, such as ginger, parsley can significantly reduce systolic and diastolic blood pressure in hypertensive patients.

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