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## **A Review on the Acceptability of Use of Traditional, Complimentary, and Alternative Medicines in The Management of Hypertension**

*Aiyana Jul A. Decena, Krystine Sophia Mei G. Letada, Bai Sharjah Ayen T. Mama, Cesar Armand F. Reyes, Alfredo S. Timosan III, Lia Karylle S. Villorente, Erwin M. Faller\**

Pharmacy Department, San Pedro College, Davao City, Philippines

DOI: <https://doi.org/10.55248/gengpi.2022.3.6.1>

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### **ABSTRACT:**

The objective of this study was to conduct a systematic review of published studies on the acceptability of the use of TCAM (Traditional, Complementary, and Alternative Medicine) in the management of hypertension. Hypertension as a long-term disease cannot be managed by drug therapy only, with that, a series of articles are included to provide evidence of how TCAM alleviates the condition of people suffering from hypertension. TCAM as the totality of expertise based on theories, concepts, and experiences in treating several conditions is essential in the healthcare system. In search of existing literature, the following databases are used: PubMed/Medline, Google Scholar, Science Direct, and Cochrane. Literatures retrieved were classified and analyzed to evaluate the acceptability of the use of TCAM on the management of hypertension. Their health improves when they use traditional medicinal plants. However, a few people reported dizziness, stomach discomfort, burning, an unpleasant feeling, a drop in blood pressure and sugar, and a few persons were unsure. While Yoga, Meditation, Relaxation Techniques, Acupressure, and Acupuncture are among the most popular alternative medicine interventions that have been shown to lower blood pressure despite this evidence, it has not been proved clearly that they may be used to manage hypertension. Furthermore, the significant reduction in systolic and diastolic blood pressure of hypertensive patients from the use of complementary and alternative interventions in the various articles reviewed can contribute positively to the reduction of blood pressure. Results found that TCAM has long been utilized to manage hypertension and the use of some TCAMs can be an acceptable means to manage hypertension, according to the studies.

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### **Introduction:**

The interest in Traditional, Complementary and Alternative Medicine (TCAM) has grown in recent years, and the general public's opinion toward these therapies has largely been positive. However, many medical experts continue to argue and question their clinical effectiveness [1]. This review addresses the effect and acceptance of utilizing traditional, complementary, and alternative medicines in treating and handling patients with hypertension. Hypertension or High Blood Pressure is one of the most crucial cardiovascular risk factors worldwide. With only drug therapy in treatment, only about a third of patients achieve optimal blood pressure control [2]. With that, the goal of this review is to assess if the use of TCAM in the management of hypertension is acceptable or opposed.

Traditional medicine has a distinguished history, referring to the totality of all information, expertise, and practices based on theories, concepts, and experiences indigenous to many communities, whether explicable or not, that are employed in the maintenance of health. The terms "complementary medicine" and "alternative medicine" refer to a wide range of healthcare approaches that are not fully integrated into a country's traditional or conventional medicine [3]. An evidence-based approach to the treatment of hypertension might include a variety of complementary and alternative medicine methods. Numerous complementary and alternative health techniques are rapidly improving as part of a blood pressure-lowering lifestyle change program. According to research, psychological and physical therapies, such as relaxation techniques and yoga, Ayurveda and acupuncture, herbal medicines, and many more may assist persons with hypertension to lower their blood pressure [4]. The healing approach chosen by a person may depend on the individual's health perspective, it may differ from that of another. Traditional, complementary, and alternative medicine are important parts of the entire healthcare system, with the same goal of making people's lives better.

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### **Methodology:**

#### **2.1 Search strategy**

This study conducted a systematic search of existing literature including articles reporting on the acceptability of the use of Traditional, Complementary, and Alternative medicines (TCAM) on the management of Hypertension using the following databases: PubMed/Medline, Google Scholar, Science Direct, and Cochrane. Handsearching relevant articles pertaining to the research topic was employed to help ensure the captivity of all necessary existing literature/articles. The search was confined to research articles/studies published from 2010 to present using the related search terms

which are but not limited to “traditional, alternative, and complementary medicine for hypertension,” “traditional medicine for hypertension,” “Alternative medicine for hypertension,” “complementary medicine for hypertension,” and more.

The search strategy used in the searches in Pubmed was based on a combination of medical and TCAM interventions in the subject heading mentioned above. The searches were conducted independently by 6 investigators (AJ Decena, KSM Letada, BSA Mama, CA Reyes, LK Villorente, A III Timosan) who retrieved relevant studies published from 2010 to present. After the retrieval of the articles, the data was extracted and classified whether it is a human or an animal study; intervention types are identified (herbal medicine, yoga, naturopathy, homeopathy, acupuncture, and more), and therapeutic evidences were analyzed and discussed as to assess the acceptability of the use of TCAM on the management of hypertension.

## 2.2 Study Selection

The inclusion criteria for this literature review were as follows: (1) articles on traditional medicines for the management of hypertension, (2) articles on alternative medicines for the management of hypertension, (3) Complementary medicines for the management of hypertension, (4) in vivo or in vitro studies, while the exclusion criteria included the following: (1) articles that were not in English language, (2) articles that were not focusing on the management of hypertension and (3) did not use traditional, alternative, and complementary medicine treatment for hypertension. The Full articles that were retrieved met the criteria and were read carefully by the investigators.

## Results and Discussion:

### 3.1 Literature Search

The search yielded 50 articles and each article was screened for a full text assessment. In this literature review, 50 articles were utilized.

**Table 1. Traditional Medicine Use in the Management of Hypertension**

Authors	Traditional Medicine	Therapeutic Evidence
Mphuthi <i>et al</i> , 2022	<i>Moringa oleifera</i> , <i>Annona muricata</i> , <i>Allium sativum</i> , <i>Citrus aurantiifolia</i> , <i>Zingiber officinale</i> , <i>Cymbopogon andropogoneae/citratus</i> , <i>Artocarpus altilis</i> , <i>Uncaria tomentosa</i> , <i>Ananas comosus</i> , <i>Bixa orellana</i> , <i>Cassia grandis</i> , <i>Momordica charantia</i> , <i>Cecropia peltata</i> , <i>Cinnamomum verum</i> .	According to the evidence, Traditional medicinal plant use improves their health status. The majority of participants stated that they are not experiencing any adverse effects from the traditional medicinal plants. However, dizziness, stomach upset and burning, an unpleasant feeling, and a reduction in blood pressure and sugar were noted [5].
Xiong <i>et al</i> , 2013	Huanglian Jie Du Tang	Huanglian Jie Du Tang has been proven in studies to enhance 6-keto-prostaglandin (6-K-PG) and 6-K-PG/TXA2 levels while reducing TXA2 in SHR. These data indicate that PGI2 and TXA2 optimize hemodynamics and maintain the coagulation-anticoagulation balance [6].
He <i>et al</i> , 2020	Qingxuanjiangya (QXJYD)	In the current study, researchers discovered that QXJYD could considerably lower increased systolic blood pressure using a SHR model, confirming its therapeutic efficacy over hypertension. QXJYD, such as rhynchophylline, gastrodin, and baicalin, have been evidenced to have anti-hypertensive properties [7].
Neamsuvan <i>et al</i> , 2017	<i>Neamsuvan</i> , <i>Allium sativum L</i> , <i>Annona muricata L</i> , <i>Coriandrum sativum L</i> , <i>Alyxia reinwardtii</i> , <i>Dracaena cochinchinensis</i> , <i>Aloe vera (L.)</i> , <i>Artemisia annua L</i> , <i>Blumea balsamifera</i> , <i>Carthamus tinctorius</i> , <i>Tithonia diversifolia</i> , <i>Bixa orellana</i> , <i>Capparis micracantha</i>	According to evidence, treatment for hypertension were Asteraceae, Piperaceae, Rutaceae, or Zingiberaceae (4 species each). There have been reports of 37 species being used in traditional medicine. Antihypertension activity and toxicity have already been examined in 24 and 46 species, respectively [5,8].

Zhang <i>et al</i> , 2020	(TCM) Decoction or Granules	GUG, a traditional Chinese herbal combination, has been shown to lower daytime and 24-hour ambulatory blood pressure in individuals with masked hypertension [19].
Shi <i>et al</i> , 2020	(TCM) Sang qi granules	SQG has been found in several animal experiments to reduce blood pressure and cardiac fibrosis by decreasing inflammatory responses. However, this has not yet to be validated in a normal clinical investigation. It's unclear whether SQG can increase endothelial cell function [10].
Lai, 2022	(TCM) Songling Xuemaikang capsule	Evidence shows Songling Xuemaikang capsule (SXC) was well tolerated and non-inferior to losartan in decreasing blood pressure in persons with moderate hypertension. SXC could be a good choice for mild hypertension, especially for those who prefer natural treatment [11].
Cabrera, 2019	(TCM) Tian Ma Guo Teng Yin	According to Eastern Medicine, Tian Ma Gou Teng Yin (TMGTY) is used effectively to treat essential hypertension. This has a direct impact on vascular system contraction and relaxation. TMGTY, calcium channel blockers, and angiotensin converting enzyme inhibitors were used as a combination that reduced systolic and diastolic blood pressure. There was no significant difference in blood pressure decrease when diuretics were compared to the other combinations with TMGTY and Western medicine [12].
Ried <i>et al</i> , 2012	<i>Allium sativum</i> (Garlic)	Evidence shows that consumption of 400mg of garlic extract twice daily for 8 weeks significantly resulted in a depletion in systolic blood pressure [13].
Marhuenda, Javier <i>et al</i> .,2021	<i>Hibiscus sabdariffa</i> (HS) and <i>Lippia citriodora</i> (LC)	This study proves that the daily consumption of the combination of <i>Hibiscus sabdariffa</i> and <i>Lippia citriodora</i> results in a decreased diastolic, systolic and pulse pressure in hypertensive patients [14].
Ferreira, Luciana Garros <i>et al</i> .,2017	Thyme ( <i>Thymus vulgaris</i> )	In this study, a compound in thyme called rosmarinic acid showed apparent effectiveness towards lowering blood pressure by reducing the Angiotensin-converting enzyme activity [15].
Shirzad, Fatemeh <i>et al</i> .,2021	Cinnamon ( <i>Cinnamomum verum</i> )	In this placebo-controlled trial, the use of cinnamon reduced ambulatory systolic blood pressure, diastolic blood pressure, and improved lipid profile of stage 1 hypertension patients [16].
Xu, Renfan <i>et al</i> .,2020	Green tea ( <i>Camellia sinensis</i> )	This study reveals after observational trials involving 1697 individuals, that green tea supplementation has a positive effect in hypertensive patients in terms of lowering both systolic blood pressure and diastolic blood pressure [17].
Lestari <i>et al</i> .,2017	<i>Momordica charantia L.</i>	In accordance with the results, it has been concluded that an ethanolic extract of bitter melon ( <i>Momordica charantia L.</i> ) leaves containing 80 percent ethanol provides inhibition. Hence, it is proven to have antihypertensive properties [18].

Emamat, Hadi <i>et al.</i> ,2022	<i>Berberis integerrima</i>	The study has found that daily consumption of 10g seedless purple-black barberry lowers systolic and mean arterial blood pressure. However, further research must be done to assess the antihypertensive properties of barberry [29].
Rizka <i>et al.</i> ,2017	Black Cumin ( <i>Nigella sativa</i> )	This study shows that oral administration of 300mg <i>Nigella sativa</i> seed extract twice daily, affected the systolic and diastolic blood pressures (SBP and DBP) of elderly hypertensive individuals [20].
Rosa <i>et al.</i> ,2021	<i>Apium graveolens</i> L.  <i>Allium sativum</i> L.	In a study conducted in South Sulawesi, phytochemical testing, pharmacological tests revealed systolic and diastolic blood pressure. Blood pressure dropped by a significant amount (p=0.05). Therefore, a combination of garlic and celery can be a traditional medicine for hypertensive patients [21].
Awaad, Amani A <i>et al.</i> ,2018	<i>Matricaria chamomilla</i> L.	In this experimental study, <i>Matricaria chamomilla</i> L. extracts were subjected to quantitative and qualitative analysis. These extracts were shown to be safe for human consumption. After 1, 1.5, and 2 hours, a single oral treatment of the plant extracts (200 mg/kg) lowers both systolic and diastolic blood pressure in normotensive rats. Results show that <i>Matricaria chamomilla</i> L. possess an anti-hypertensive property [22].
Huang <i>et al.</i> , 2019	Zhengan Xifen Decoction (ZGXFD)	ZGXFD has been found in studies to reduce blood pressure and alleviate clinical symptoms such as dizziness and headache. There is, however, no comprehensive study or meta-analysis of its effects or safety. As a result, a thorough systematic review and meta-analysis is required [23].

Significantly contributing to cardiovascular and cerebrovascular events, hypertension poses a direct danger to quality of life. Over the past two decades, local and international experts have reached consensus on a multitude of hypertension treatment guidelines, and remarkable advancement has been made in the field of antihypertensive medications. Oral antihypertensive medicines represent a major breakthrough in hypertension treatment. Unfortunately, the blood pressure standard for hypertensive patients is far from adequate [34].

Due to the body's responsive propensity to herbs and the low occurrence of adverse effects, herbal medications are currently used by around 75–80 percent of the world's population, including hypertension patients [59]. Several naturally occurring plants in different regions of the world were identified to significantly lower blood pressure [4-23]. It is available in various dosage forms which include, oil extracts [13,18,20,22], direct oral consumption [29], tea preparations [17] and herbal combinations [10,19]. These medicinal plants contain active compounds that specifically lower the diastolic and systolic blood pressure of hypertensive patients [4-6,10-11,14,17,19,22]. The mechanism of action of other herbs is via inhibiting angiotensin converting enzymes [12,15,18] or reducing interleukin 6 (IL-6), c-reactive protein (CRP), and Erythrocyte sedimentation [16].

Numerous antihypertensive drugs and lifestyle modifications have been demonstrated to lower blood pressure [39]. The exploration of Chinese herbal formulations for the cure of hypertension has gained considerable attention from researchers. These studies aim to integrate Chinese traditional and Western medicine. Consequently, it is recognized that Chinese herbal remedies have an exceptional benefit in terms of body management. The research demonstrates that Chinese medicine has a myriad of defensive mechanisms and chinese herbal formulae are well-known for their superior ability with regard to the regulation of the body [6,34].

In the management of hypertension, reviewing these findings, adopting an active lifestyle, optimizing one's nutrition, managing total calorie intake, and engaging in appropriate physical exercise all play important roles [57]. Traditional medicines improve the health of people with hypertension in general, but physicians' assistance is required.

Table 2. Complementary Medicine/Interventions Used in the Management of Hypertension

Authors	Intervention	Therapeutic Evidence
Cramer <i>et al</i> , 2018  Cramer, 2015  Murthy <i>et al</i> , 2011	Yoga	<p>90 minutes of yoga intervention obtained 24-hour blood pressure (BP) that is significantly lower than those who did not have yoga postures intervention; although, diastolic did not significantly differ across groups [24].</p> <p>Complementary intervention of yoga reported 10 mmHg reduction in systolic and 8 mmHg in diastolic blood pressure; this intervention is only an adjunct to antihypertensive treatment and not an alternative [25].</p> <p>Reduction in systolic and diastolic BP observed after starting a non pharmacological approach of yoga and naturopathy to patients with mild to moderate hypertension with antihypertensive medicines; a valuable approach in the treatment of hypertension [26].</p>
Brook <i>et al</i> , 2013  Ponte <i>et al</i> , 2018	Meditation techniques  Mindfulness meditation	<p>Blood pressure can be lowered with a variety of antihypertensive drugs and lifestyle changes. The evidence for Transcendental Meditation and other meditation techniques was generally sparse, mixed, or non-existent. Once clinically appropriate, the writing group believes it is reasonable for all patients with blood pressure levels greater than 120/80 mm Hg to consider trials of alternative approaches as adjuvant methods to assist in reducing blood pressure [35].</p> <p>Mindfulness significantly lowered ambulatory BP, systolic BP; 8th week of intervention lowered significantly the systolic BP, 24-hour systolic BP, at-rest systolic BP, and diastolic BP [27].</p>
Xu <i>et al</i> , 2020	<i>Green Tea Supplements</i>	<p>Green tea effectively decreased systolic and diastolic blood pressure during the course of 24 short-term studies, according to a 2020 comprehensive review and meta-analysis of 24 trials comprising 1,697 participants. Additional high-quality trials with larger sample numbers, longer durations, and diverse catechin dosages are needed before green tea supplementation may be advised as part of an antihypertensive therapy, according to the authors [36].</p> <p>Green tea has been reported to reduce blood levels and thus the efficiency of the beta-blocker nadolol at high dosages. It could also, potentially, cause interactions with other medications [36].</p>

<p>Zheng <i>et al</i>, 2019</p> <p>Abdi <i>et al</i>, 2017</p> <p>Huang, K. Y., Huang, C. J., &amp; Hsu 2020</p>	<p>Acupuncture</p>	<p>Active acupuncture significantly lowered systolic blood pressure in the following weeks:  Week 6 (7.2 mm Hg), week 9 (8.9 mm Hg), and week 12 (7.8 mm Hg) while significant improvement on diastolic blood pressure showed at weeks 9 and 12; decreased the systolic blood pressure of patients with stage I hypertension by nearly 8 mm Hg after receiving 18 sessions of the intervention in a 6 week treatment [28].</p> <p>Reduced systolic and diastolic BP from a 6 weeks abdominal electro-acupuncture intervention [29].</p> <p>Acupuncture together with antihypertensive agent may be helpful in lowering BP as well as regulating the autonomic nervous system (30).</p>
<p>Bischoff-Ferrari <i>et al</i>, 2020</p>	<p><b><i>Omega-3 Fatty Acid Supplements</i></b></p>	<p>Albeit the results of randomized controlled trials are equivocal, data suggests that omega-3 fatty acids from fish oils could assist to decrease blood pressure [37].</p> <p>A randomized controlled trial including 2,157 persons aged 70 and up was conducted in 2020 to recognize if vitamin D, omega-3 fatty acids, and a strength-training exercise regimen, either alone or in combination, benefited health outcomes, together with hypertension, amongst older adults. The study found little statistically significant variations in systolic or diastolic blood pressure, nonvertebral fractures, physical performance, infection rates, or cognitive function after therapy with vitamin D3, omega-3s, or a strength-training exercise program [37].</p>
<p>Greenhalgh <i>et al</i>, &amp; Dundar, 2010</p>	<p>Biofeedback</p>	<p>Owing to the fact that it has been documented to have other health benefits, only a limited fraction of convincing evidence has been found to demonstrate the effectiveness of any particular biofeedback treatment in the control of essential hypertension when contrasted to pharmacotherapy, placebo, no intervention, or other behavioral therapies [38].</p>
<p>Lin <i>et al</i>, 2016</p> <p>Zubaidah <i>et al</i>, 2021</p> <p>Wariin, 2018</p>	<p>Acupressure</p>	<p>Taichong acupoint significantly lowered systolic and diastolic BP in patients with hypertension. The effect lasted for 30 minutes [31].</p> <p>Acupressure therapy done 3 times for 3 days reported that there was a reduction in systolic and diastolic BP in hypertensive patient [32].</p> <p>60 year old with hypertension had decreased in BP after acupressure intervention from the effects of acupressure using Taixi and Sanyinjiao pressure points [33].</p>

As presented in table 2, multiple interventions have been identified in the articles reviewed that showed good potential effects on patients with hypertension. Countless distinctive techniques have been studied for their possible blood pressure-lowering properties throughout the past few decades. Conversely, these non-dietary and non-drug treatments, known collectively as alternative methods, have often been subjected to fewer and less thorough trials [39]. One of the most common complementary medicine interventions that have been reported to have reduced blood pressure are Yoga, Meditation, Relaxation Techniques, acupressure and acupuncture [29-33] and although given this evidence, it has not been established clearly that it can be acceptably used to manage hypertension albeit the reports of significantly reducing the blood pressure of hypertensive patients due to several

reasons that lowering the blood pressure of patients who wish to use these interventions as a management of their hypertension is going to be a long term and sustained process [24, 26].

Some supplementations have been helpful in the management of hypertension [36, 37]. The 3-year treatment with vitamin D3 (2000 IU/d), omega-3 fatty acids (1 g/d), or a strength-training exercise regime did not lead to statistically significant differences in progress in systolic or diastolic blood pressure, nonvertebral fissures, physical prowess, infection rate, or cognition in the randomized trial of 2157 adults aged 70 years or older [36]. Correspondingly, while there may be other reported life advantages to its use, no compelling evidence that consistently exemplifies the efficiency of any particular biofeedback intervention in the control of essential hypertension was observed [38].

Green tea, on the contrary, drastically decreased SBP and DBP throughout the short-term trials. Nevertheless, larger and longer-term trials are required to much farther analyze the overall impact of green tea supplementation on blood pressure control and clinical activities [37].

Between several behavioral therapies, Transcendental Meditation, other meditation techniques, yoga, other relaxation therapies, and biofeedback strategies had moderate, incoherent, or no evidence demonstrating their effectiveness. Among the examined noninvasive therapies and devices, device-guided breathing was found substantiated more than acupuncture. The data backing exercise-based regimens, notably aerobic, dynamic resistance, and isometric handgrip, were relatively stronger [39].

A proposed management algorithm is presented, along with recommendations for prioritizing the use of the multiple tactics in clinical practice based on their level of information for blood pressure lowering, risk-to-benefit ratio, potential ancillary health advantages, and practicability [56].

Based on the articles reviewed, several studies [25,30-31] have reported these complementary treatment interventions can be acceptably used as an adjunct treatment together with antihypertensive medication in managing hypertension. Although further studies are still needed to established the ultimate acceptability of the use of these complementary medicines, it is good to note that it is suggested nonpharmacological interventions such as the aforementioned complementary interventions should be instituted in all patients with hypertension to help decrease risks and the need for drug therapy if done early [32].

Moreover, given these results, the significant decrease in the systolic and diastolic blood pressure of the hypertensive patients from the use of complementary interventions in the different articles reviewed can contribute positively to the reduction in mortality caused by stroke, coronary heart disease, and in-all-cause mortality [25]. This fact indicates the positive aspect of the use of complementary intervention as an acceptable treatment in the management of hypertension.

Table 3. Alternative Medicine Use in the Management of Hypertension

Authors	Intervention	Therapeutic Evidence
Valls <i>et al</i> , 2021	Herbal Medicine	A study about the effects of orange juice containing Hesperidin was employed for blood pressures in mildly hypertensive patients to assess the sustained and acute effects. After a single dosage, hesperidin in orange juice decreases systolic and pulse, and chronic ingestion of enriched orange juice improves its postprandial effect. Changes in Blood Pressure were accompanied by decreases in systemic and transcriptome indicators. In pre- and stage-1 hypertensive people, enriched orange juice could be a beneficial co-adjuvant tool for blood pressure control [40].
Matsutomo, 2020	Dietary Supplements	Dietary supplements are utilized as alternative treatments to prevent and treat hypertension. Antioxidants, fish oil, and a variety of herbal products are among the most regularly utilized dietary supplements [41].
Zhang <i>et al</i> , 2018	Acupuncture	The effects of acupuncture treatment at Fengchi (GB 20) and Neck-Jiaji (EX-B 2) blended with acupuncture technique for stimulating blood circulation, eradicating wind, and controlling the liver and spleen reduce morning blood pressure in patients with essential hypertension, relieve hypertension symptoms such as headache, vertigo, and tinnitus, and are better than the effects of acupuncture technique for activating blood circulation [42].

Yang <i>et al.</i> , & Wang, 2014	Massage Therapy	Tuina, a type of Chinese massage, is widely practiced in China and may be useful in treating essential hypertension (EH). A total of 479 participants were included in seven randomized trials. A meta-analysis found that Tuina combined with antihypertensive medicines had better results than antihypertensive drugs alone. Tuina may be a useful adjuvant for patients with EH, according to the findings of the review, albeit the results are of limited importance due to clinical heterogeneity and low methodological quality of the included trials [43].
Vakil, 2022	Homeopathic Medications	<p>Belladonna - known for its effectiveness in treating hypertension, and remarkable improvement in patients having fast pulse rate, flushed face, and dilated pupils.</p> <p>Aconitum - a useful homeopathic remedy for patients suffering high blood pressure that occurs suddenly.</p> <p>Nux Vomica - known for lowering blood pressure caused by excessive eating [44].</p>
Hartinah <i>et al.</i> , 2019	Hydrotherapy	The goal of this study is to see how hydrotherapy affects the blood pressure of hypertension patients. The findings show that hydrotherapy has an effect on blood pressure, with a difference in the average decrease of systolic blood pressure of 19,000 mmHg and diastolic blood pressure of 4,000 mmHg, with a -value of 0.000 for systolic and 0.0443 for diastolic. The researchers find that hydrotherapy impacts hypertension patients' blood pressure by reducing their systolic blood pressure [45].
5 Ayurvedic Medicine For Blood Pressure(BP) Control - Active Living. (2021).	Ayurvedic Medicine	<p>Amla - also known as Indian Gooseberry, is an ayurvedic blood pressure treatment. It contains Vitamin C, which lowers blood cholesterol and dilates blood vessels. Amla juice taken on an empty stomach every morning can help to reduce hypertension and other diseases.</p> <p>Gotu Kola - Ayurvedic medicine uses Gotu Kola, also known as Indian Pennywort. When consumed in tiny doses, this bitter plant can help with blood circulation and blood pressure control.</p> <p>Ashwagandha - often known as Indian Ginseng, is a natural herb that can be used in tiny amounts in your evening tea. Along with acupressure spots for blood pressure, it has been shown to reduce blood pressure. It has also been shown in studies to lower blood sugar levels in diabetics.</p> <p>Garlic - lowers blood pressure and lowers cholesterol levels since it is a natural blood thinner.</p> <p>Honey - an excellent remedy for relaxing blood vessel walls and lowering blood pressure [46].</p>
Ayurvedic Management of Hypertension - Vibrant Ayurveda (2020)	Ayurveda	Shirodhara (oil treatment on the forehead) - This is a particular head treatment for hypertension relief. Warm medicinal oil is continuously poured in streams across the forehead, promoting regular neural activity and rectifying blood flow through the arteries [47].



Cormick <i>et al</i> , 2022	Dietary Supplement	Increase in Calcium intake slightly lowers both systolic and diastolic blood pressure in normotensive adults, especially in young people, implying a role in hypertension prevention. Even slight blood pressure reductions could have significant health effects in terms of preventing vascular disease. Lowering systolic blood pressure by 2 mmHg is expected to result in a 10% reduction in stroke mortality and a 7% reduction in ischemic heart disease mortality [48].
Ananda & Narmawan, 2020	Herbal Medicine	In people with hypertension, Nigella sativa oil lowers blood pressure considerably. As a result, nigella sativa oil can be utilized as a hypertension alternative [49].
Peixoto-Neves <i>et al</i> , 2014	Herbal medicine(Basil)	Basil, a herbal medicine, is used to treat hypertension because of eugenol present in it. Eugenol has been demonstrated to relax conduit and ear arteries and reduce systemic blood pressure. Eugenol dilates cerebral arteries by means of multimodal inhibition of voltage-dependent Ca <sup>2+</sup> channels [50].
Rodriguez-Leyva <i>et al</i> , 2010	Herbal medicine (Flaxseed)	Flaxseed is an alternative to marine products. It is one of the richest sources of alpha-linolenic acid, a plant-based fatty acid (ALA). Ingestion of ALA has been suggested to have a positive impact on hypertension based on the results of clinical trials, epidemiological investigations, and experimental studies. Flaxseed has been recommended to combat hypertension due to its high ALA content [51].
Mihailovic-Stanojevic <i>et al</i> , 2016	Herbal medicine (Thyme)	In this study, They discovered that in hypertensive rats, wild thyme (a spice plant high in polyphenolic compounds) reduced blood pressure and vascular resistance. The inverse relationship between vascular resistance and plasma heme oxygenase-1 suggests that the normalization of blood pressure is due to endogenous vasodilator carbon monoxide produced by heme oxidation [52].
Hasani <i>et al</i> , 2019	Herbal medicine (ginger)	From this study, ginger was told to have a favorable effect on lowering the blood pressure in our body. Only in the subset of studies with a mean age of 50 years, an 8-week follow-up period, and ginger doses of 3 g/d did systolic and diastolic BP significantly decrease [53].
Cloud <i>et al</i> , 2020 McEwen, 2020	Herbal medicine (Hawthorn)	This study has shown that hawthorn tablets and liquid drops are proven to reduce the blood pressure in our body. There is no reported serious side effects on taking Hawthorn for hypertension. Hawthorn can only have significant reduction in blood pressure when it is taken or applied for at least 12 weeks [54].
Rahmawati <i>et al</i> , 2018 Kartikasi, 2018	Hydrotherapy	Based on the results of data analysis with Independent T-Test, p=0,001 (p0,05) for systolic blood pressure and p=0,028 (p0,05) for diastolic blood pressure were determined in the hydrotherapy study. It means that hydrotherapy had an effect on hypertension patients' blood pressure. Drinking 4 glasses of water after waking up can help in controlling blood pressure [55].

### Discussion for table 3:

Medicinal herbs have been commonly utilized as an alternative treatment to treat hypertension (58). Several other modalities have been studied for their possible blood pressure-lowering property throughout the last few decades. As presented in table 3, several studies determined the potential of herbal medicine consumption to significantly affect the diastolic and systolic blood pressure of hypertensive patients [40,49-54]. Moreover, mind-body alternatives such as ayurvedic medicine, massage, hydrotherapy and acupuncture are also helpful in managing the said disease [42-47]. Alternative

medicine is often used when patients prefer self-medication, such as, regular usage of dietary supplements that contain antioxidants, fish oil, and a variety of herbal products that can assist in the prevention and management of hypertension [41]. Overall, the high rate of self-medication with alternative medicines described in this review suggests that these alternatives are acceptable interventions in the management of hypertension given the significant good effects brought about by these treatments reported in the articles reviewed.

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## Conclusion:

Upon reviewing these findings, traditional, complementary, and alternative medicine has been widely used for a long time to treat hypertension. Researchers from all nations continue to conduct studies on TCAM's effectiveness in treating hypertension and how to manage it. Some treatments/interventions take weeks before a significant effect on our blood pressure occurs, which is not great for patients suffering from chronic hypertension. The use of some TCAMs is excellent for those patients who like to self-medicate since the use of TCAMs does not often lead to serious side effects. According to the data gathered in this review, the majority of people treated their hypertension with either traditional, alternative or complementary treatments. Traditional medicines, particularly traditional Chinese medicines, have a diverse set of defense mechanisms. Several studies have discovered that complementary medicines can be used in conjunction with antihypertensive medication to effectively manage hypertension. From the studies provided above, we could conclude that some but not all TCAMs are significantly effective in managing hypertension and some are acceptable means or interventions in managing hypertension. Even so, it is still advisable for patients to ask their physicians before trying a particular medication/intervention as further studies are still needed for the aforementioned TCAMs to be established as a clinically accepted modality to be used for the management of hypertension.

## CONFLICT OF INTEREST

The authors have no conflict of interest.

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