

Meghalaya's traditional dietary plants: natural solutions for hypertension and cardiovascular protection

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Abstract

Hypertension is a serious health concern globally, affecting millions of people worldwide. In Meghalaya, plants have been used for generations to treat various ailments, including hypertension. Although most studies focus on the antihypertensive effect of single medicinal plants in isolation, there appear to be few studies based on the combination of such plants. Among these, Solanum species, Houttuynia cordata, and Allium species not only serve culinary purposes but also demonstrate a significant potential for managing hypertension. Research suggests that these plants contain bioactive compounds such as flavonoids, phenolics and other antioxidants that may exhibit synergistic effects when consumed in combination, enhancing their therapeutic potential against hypertension. Given the complementary interactions of these phytochemicals, specific identification and classification of key antihypertensive plants can inform modern dietary guidelines, facilitating the integration of local knowledge into contemporary hypertension management and potentially leading to new, plant-based interventions tailored to regional practices in Meghalaya.

Keywords: Anti-hypertensive, cardiovascular disease, hypertension, Meghalaya, traditional medicine.

Introduction

Cardiovascular diseases (CVDs) are the number one cause of death worldwide. In the last 30 years, deaths from CVDs have gone up by 60%. Today, CVDs claim over 20 million lives every year according to the World Heart Federation (WHF) (Heene *et al.* 2023). As of 2017, CVDs accounted for 26.6% (25.3-27.4%) of all mortality and 13.6% (12.5-14.6%) of total Disability-Adjusted Life Years (DALYs) in India, compared to 15.2% (13.7-16.2) and 6.9% (6.3-7.4) in 1990 (Kalra *et al.* 2023), the demographic shift towards an ageing population

makes this a bigger public health challenge as people above 60 are more vulnerable to CVDs (Singh *et al.* 2024). In India, the absence of a thorough data collection framework for cardiac morbidity and mortality, notwithstanding the significant incidence of heart disease, impedes effective management and resolution of the problem. The predominance of fatalities occurring at home without a definitive cause of death further intensifies the challenge. Although hospital-based studies provide valuable insights, they may not comprehensively reflect the nation's total burden of heart disease (Ram *et al.* 2023).

Non-communicable diseases (NCDs) contribute significantly to the overall disease burden observed in Meghalaya. Among these, CVDs represent a significant health concern, particularly within the elderly demographic. As individuals advance in age, especially those who are 70 years or older, the likelihood of mortality attributable to CVDs markedly escalates. Indeed, cardiovascular disease (CVD) is responsible for more than 25% of fatalities within this age cohort in Meghalaya, underscoring the imperative for strategic healthcare interventions and preventive measures to tackle this escalating public health issue (Public Health Foundation of India 2018). However, when considering the risk of CVD events like myocardial infarction, stroke, heart failure and end-stage renal disease, it can be significantly reduced by controlling hypertension, the most modifiable risk factor for CVD. Hypertension is a growing global health problem, affecting people in low and middle-income countries more than in high-income countries (Mills *et al.* 2020; Vaduganathan *et al.* 2022). In contrast, according to statistics from the National Family Health Survey (NFHS-5) 2019-2021, hypertension in Meghalaya is greater in urban than rural areas. This disparity could be linked to lifestyle factors. Urban populations face increased stress, inactivity and unhealthy dietary habits. Conversely, rural populations exhibit greater physical activity and healthier eating patterns. The conventional rural way of life, involving manual labour and home-cooked nutrition, likely leads to lower hypertension prevalence.

The antihypertensive drugs used to treat hypertension do reduce the risk of serious CVD events like heart attacks and strokes. Nevertheless, the prolonged administration of these pharmacological agents can incur substantial financial burdens. Of greater concern, such usage elevates the likelihood of experiencing adverse effects, which can manifest as serious conditions such as hypotension, syncope, dysregulation of electrolytes, and acute renal impairment. (Sheppard *et al.* 2018). Consequently, although antihypertensive medications provide significant assistance, alternative and adjunctive treatments may prove exceedingly beneficial, particularly for individuals experiencing mild to moderate hypertension. There is ongoing research into the possibility of plant-based compounds as

alternatives to current therapies or components of combination therapy for managing hypertension. Plant-based compounds may improve therapeutic results and safety with lessening adverse effects (Sacks *et al.* 1999).

In Meghalaya, traditional dietary practices are deeply intertwined with the region's rich biodiversity, particularly in utilising specific plants known for their health benefits. Several plants in Meghalaya have potential for their antihypertensive role, among these, some notable antihypertensive plants include *Houttuynia cordata* Thunb. (Pradhan *et al.* 2023), *Solanum lycopersicum* L. (Kumar *et al.* 2021), *Solanum betacea* Cav. (Machado *et al.* 2024), *Solanum gilo* Raddi. (Lalhminganga *et al.* 2018), *Sesamum indicum* L. (Elleuch *et al.* 2011), *Centella asiatic* L. Urb (Bunaim *et al.* 2021), *Allium sativum* L. (Al-Qattan *et al.* 2003), *Allium cepa* L. (Galavi *et al.* 2021), *Allium tuberosum* Rotler ex Spreng (Nong *et al.* 2024) and *Clerodendrum colebrookianum* Walp. (Lokesh and Amitsankar 2012). While there have been many studies on the antihypertensive properties of individual plants, there is little research on the synergistic effect of combining these plants. This review aims to explore the medicinal plants used in Meghalaya to treat hypertension and related disorders. By examining the pharmacological properties and synergy of antihypertensive plants like *H. cordata*, *Solanum* species, *Allium* species and others we hypothesise that specific plant combinations may have more therapeutic effects than individual use. What is particularly interesting is that apart from their use as medicinal agents, these plants are also part of the local cuisine. They are very often eaten fresh as salads or added to traditional dishes. The diverse culinary usage of these plants brings interesting questions about how they might synergise, or otherwise, enhance health outcomes when combined. This hypothesis warrants further investigation into the potential of Meghalaya's traditional medicinal flora for developing novel, plant-based interventions for hypertension management.

Some promising antihypertensive plants of Meghalaya

Medicinal plants have been a crucial part of the diet and treating various ailments of the tribals of Meghalaya for generations. The therapeutic efficacy of these plants is attributed to their phytochemical constituents. Phytochemicals are naturally occurring plant-derived compounds. They serve as direct medicinal agents and raw materials for the pharmaceutical and aromatic industries. In contrast to synthetic pharmaceuticals, phytochemicals typically exhibit a reduced risk of adverse effects. These compounds, present in various plant parts such as leaves, stems, roots, and fruits, serve crucial roles in plants' growth, development, and defence mechanisms. Their antioxidant properties are gaining increasing recognition.

These compounds are linked to numerous potential benefits, such as antioxidant, anti-inflammatory, antimicrobial and anticancer effects. Additionally, they may contribute positively to cardiovascular, immune, and cognitive health (Balandrin and Klocke 1988; Nanjian 2006; Tyagi *et al.* 2010; Banu and Cathrine 2015). In examining the pharmacological properties of selected plants, it becomes evident that Meghalaya's traditional dietary flora possesses remarkable therapeutic potential. The rich phytochemical composition of these plants, particularly those used in local cuisine, underscores their role in managing hypertension and supporting cardiovascular health. The following paragraphs highlight some of the most effective plants known for their antihypertensive properties.

***Houttuynia cordata* Thunb.**

H. cordata is an aromatic medicinal herb with creeping roots, commonly known as fish mint or fish wort. The plant was exclusively found in damp and shady environments (Bhattacharyya and Sarma 2010). In Meghalaya, the entire plant of *H. cordata* is eaten raw as a medical salad or cooked to lower blood sugar levels and is generally known as *Jamyrdoh* (by the Khasis and Jaintias), which is shown in **Table 1** (Kumar *et al.* 2014a). Furthermore, leaf juice is used to treat cholera and dysentery (Laloo and Hemalatha 2011), as well as to cure blood deficiencies and purify the blood. *H. cordata* has several medicinally relevant functions, including anti-leukemic, anti-cancer, adjuvanticity, antioxidant, anti-inflammatory, anti-mutagenic, anti-viral, anti-obesity, anti-bacterial, anti-diabetic and anti-allergic properties (Kumar *et al.* 2014b; Yang and Jiang 2009; Pradhan *et al.* 2023). Many studies have indicated that *H. cordata* is rich in bioactive compounds comprising phenols, essential oils, flavonoids, alkaloid compounds, volatile oil components, natural acids and secondary metabolites comprising fatty acids, sterols, terpenes, saponins, glycosides, tannins, quinines and lactones (Pavan *et al.* 2009). *H. cordata* also improves endothelial function by increasing the availability of nitric oxide (NO). Evidence indicates that NO plays a significant part in controlling blood pressure, and reduced NO function is a key factor in hypertension (Hermann *et al.* 2006).

***Solanum lycopersicum* L.**

The tomato (*S. lycopersicum*; *Lycopersicon esculentum* L.) is the fruit of a perennial herbaceous shrub in the Solanaceae family. In Meghalaya, it is called as *Sohsaw* and it is widely cultivated in the Ri-bhoi District and can be grown both during the kharif and rabi seasons; however, the high-altitude regions of the East Khasi Hills district have recently

adopted tomato cultivation on a large scale and it has spread to various areas due to the high return during the off-season (Nongbri and Odyuo 2022). It is consumed as a vegetable or in a raw salad form. Traditionally, the various portions of the tomato have been utilized orally and externally to treat a variety of ailments around the world. For example, fresh juice is given orally to induce vomiting in response to food poisoning and extracted juice is applied externally to reduce excessive bleeding from wounds and cure furuncles and bites from insects. The pulp of the fruit is used fresh as a febrifuge and among pregnant women to reduce water retention. It is also used to cleanse the kidneys and liver, and it acts as a cathartic, promoting normal digestion, which is summarized in **Table 1** (Dawid 2016). *S. lycopersicum* contains antioxidants (Frusciante *et al.* 2007), vitamins E and C, flavonoids (e.g., rutin), phenolic compounds (e.g., chlorogenic acid), carotenoids (β -carotene and lycopene) (Szabo *et al.* 2019), and glycoalkaloids (tomatine) (Friedman and Levin 1995). Furthermore, tomatoes are the primary source of lycopene in human diets (Borguini and Ferraz Da Silva Torres 2009). The aforementioned constituents of tomatoes have demonstrated significant protective properties against cancer (Sathelly *et al.* 2022), cardiovascular diseases (Przybylska and Tokarczyk 2022), and ischemia/reperfusion injury (Tong *et al.* 2016).

***Solanum betaceum* Cav.**

Tamarillo, also known as tree tomato, *Sohbaingon dieng*, or *Sohsawdieng* in Meghalaya (*S. betacea* or *Cyphomandra betacea* Cav.), is an exotic fruit belonging to the family Solanaceae, genus *Solanum*, together with tomato, capsicum and eggplant (Diep *et al.* 2022). *S. betaceum* contains high amounts of phenolics, which are strong anti-oxidants capable of preventing LDL oxidation *in vitro* (Huang and Huang 2024), anthocyanins, carotenoids, vitamins A, B6, C, and E, as well as iron, potassium, fibre, and other vital minerals for human health (Viera *et al.* 2022). It grows naturally and can be found in abundance in the gardens of most people in North Eastern India, especially in Meghalaya, Nagaland and Sikkim (Angami *et al.* 2019). The fruits can be eaten fresh, crushed with milk or water, simmered in soups and sauces, or mixed into desserts and salads. In folk medicine, the fruit with peel is used as an antimicrobial/anti-inflammatory remedy to heal sore throats and irritated gums and decrease cholesterol, which is summarized in Table 1 (Vasco *et al.* 2009). Because of its high antioxidant content, it is thought to be an effective substitute for tomato and cherry tomatoes (Angami *et al.* 2019). Pulp's health benefits include antioxidative, antiproliferative,

antinociceptive, anti-inflammatory, allergenicity, anti-obesity and antibacterial properties (Isla *et al.* 2022).

***Solanum gilo* Raddi.**

Solanum gilo Raddi, known as bitter brinjal, or *Soh-ngang-heh* in Meghalaya, is a member of the Solanaceae plant family. Characterized by its bitter flavour, the fruit of this plant is not only a culinary ingredient but also holds significant therapeutic value, making it a crucial component in both traditional and modern medicinal practices (Seal *et al.* 2016). Their uses in traditional medicine include the employment of roots and fruits as a carminative and sedative as well as in the treatment of colic and high blood pressure as summarized in **Table 1** including leaf juice as a sedative in the treatment of uterine complaints, anti-emetic as well as in the treatment of tetanus after abortion, weight reduction to the treatment of several ailments that include asthma, allergic rhinitis, nasal catarrh, skin infections, rheumatic disease and swollen joint pains, gastro-oesophageal reflux disease, constipation, dyspepsia (Lalhminganga *et al.* 2018). Fruits possess a range of bioactive properties, including anti-oxidant and anti-inflammatory effects (Tchoupang *et al.* 2022), alongside analgesic, anti-asthmatic, anti-glaucoma, hypoglycemic and hypolipidemic attributes (Odetola *et al.* 2004; Ezechukwu *et al.* 2016). Additionally, fruits are rich in compounds such as fibre, ascorbic acid, phenols, flavonoids, saponin, anthocyanin, glycoalkaloids, and α -chaconine, which are integral to their pharmacological benefits (Eze and Kanu 2014).

***Sesamum indicum* L.**

Sesame (*S. indicum*), a member of the Pedaliaceae family, was one of the first oil crops produced by humans, showing its significance and long history in human diets. It prefers hot regions, sandy, well-drained soils, and moderate rainfall (Anilakumar *et al.* 2010). In Meghalaya, it is called as *Nei-iong*, and it is largely used for its edible seeds, which are a less expensive source of fat and protein. The seeds are roasted and processed into powder for subsequent consumption in salads. Sesame seeds have become a staple in many world cuisines due to their mild flavour and rich nutritional value, which includes high levels of protein and fats (Wei *et al.* 2022). With such high protein and fat proportions, sesame seeds bring numerous health benefits to the table, making them an effective addition to any nutritious diet. As summarized in **Table 1**, Sesame has traditionally been used as a folk treatment for a variety of ailments, including intestinal blockage, asthma, allergies and eye diseases, due to its anti-inflammatory, antioxidant, and antibacterial properties (Mohamed *et*

al. 2021). Sesame seeds also include two unique substances: sesamin and sesamol, which are known to decrease cholesterol in humans and prevent excessive blood pressure (Wu *et al.* 2019). Aside from these, some therapeutic applications of sesame seeds included anti-cancer activity (Huang *et al.* 2023), as well as neurodegenerative illness, osteoarthritis, liver disease, diabetic eye disease, inflammatory bowel disease, cardiovascular disease and lung disease (Mohamed *et al.* 2021; Huang *et al.* 2023).

***Centella asiatic* (L.) Urb.**

C. asiatic Urb (gotu kola), also known as *Bat-Khliang Syiar* or *Bat Moina* in Meghalaya (Laloo and Hemalatha 2011; Bhat *et al.* 2019), is a clonal, perennial herbaceous creeper from the Umbellifere (Apiceae) family that grows in damp areas in India. It grows in swampy places in most tropical and subtropical nations, including India, Pakistan, Sri Lanka, Madagascar, South Africa, the South Pacific and Eastern Europe (Roy and Bharadvaja 2017). The whole plant is eaten raw or in a salad. In northeast India, it is used to treat diarrhoea, liver difficulties, nerve disorders, and stomach problems. It stimulates hunger, can be eaten with milk to improve memory, is beneficial for skin conditions, and acts as a blood purifier. It is also given to mothers after childbirth (De 2016), summarized in **Table 1**. It has been shown to produce a significant amount of alkaloids, tannins, flavonoids and triterpenoids (Quyen *et al.* 2020), including asiatic acid, asiaticoside, madecassic acid and madecacoside. Bioactive compounds found in *C. asiatica* have been proven to have a strong anti-hypertensive effect in a variety of hypertensive rat models (Bunian *et al.* 2021). It also exhibits anti-oxidant, neuroprotective, anti-inflammatory, anti-fungal, anti-bacterial, anti-cancer, hepatoprotective, cognitive function, wound healing, anti-diabetic and antidepressant properties (Haleagrahara and Ponnusamy 2010; Orhan 2012; Islam *et al.* 2020; Riza *et al.* 2024).

***Clerodendrum colebrookianum* Walp.**

C. colebrookianum, sometimes known as East-India glory bower, is native to India's north-east area, including West Bengal and Sikkim (Baruah *et al.* 2024). Consuming the water after boiling the leaves is a traditional practice among the Khasi and Jaintia tribes in Meghalaya, where it is commonly referred to as *Sla Jarem*, for the treatment of high blood pressure, malaria, and liver problems and application of the warmed leaf-paste to the affected area is a common traditional practice as outlined in Table 1 (Kayang *et al.* 2003; Das *et al.* 2013). People in India's Northeastern areas utilize the leaves and twigs of this plant as a home treatment for high blood pressure (Kayang *et al.* 2003; Rai and Lalramnghinglova 2010;

Tamang *et al.* 2023). The plant was found to include triacontane, amyirin, clerodin, (24s) ethyl cholesta 5, 22, 25 trien 3-ol, clerodolone, clerodendoside, B-sitosterol, clerosterol, and polyphenols (Kotoky *et al.* 2005). The polyphenols enhance the production of vasorelaxant factors such as nitric oxide (NO), which decreases hypertension (Mohamed *et al.* 2012). *C. colebrookianum* roots have anthelmintic, antibacterial, and anti-fungal qualities (Anitha and Kannan 2006; Yadav and Temjenmongla 2012; Prasad *et al.* 2015) and have been used to treat bronchial asthma, gastrointestinal tract diseases, syphilis and gonorrhoea, and a variety of hematological disorders (Kotoky *et al.* 2005)). Pharmacological studies revealed that it has hypolipidemic, antipyretic, analgesic, anthelmintic, anti-inflammatory, antioxidant, and hepatoprotective properties (Devi and Sharma 2004; Deb *et al.* 2010; Deb *et al.* 2013).

***Allium tuberosum* Rottler ex Spreng**

A. tuberosum (Chinese chive) is a perennial herbaceous plant that is native to Central Asia and Europe, however, it may now be cultivated in any region of the world (Sharifi-Rad *et al.* 2016; Jannat *et al.* 2019). In Meghalaya, it is called *Jyllang* and is widely utilized in cuisine and as an edible vegetable (Kayang *et al.* 2003). The plant is not only used as a vegetable and spice, but it is also highly valued in folk medicine for treating nocturnal emissions, abdominal pain, diarrhoea, sexual dysfunction, asthma, gastric ulcer, dyspepsia, and supporting kidney function, which is given in **Table 1** (Tang *et al.* 2017). Recent pharmacological research has shown that *A. tuberosum* and its chemical constituents (organosulfide volatile compound and phenol) have anticancer, antioxidant, aphrodisiac and nematocidal characteristics (Khairan *et al.* 2021; Shahrajabian *et al.* 2021; Nath *et al.* 2022). It also possesses antidiabetic and hepatoprotective properties (Tang *et al.* 2017).

***Allium sativum* L.**

Garlic, *A. sativum*, a member of the Alliaceae family, is well-known as a valuable spice and a popular treatment for a variety of diseases and physiological abnormalities (Londhe *et al.* 2011). Cultivated nearly throughout the world, including India (Batchvarov 1993). In Meghalaya, it is called *Rynsun* and is combined with oil to treat coughs (Meghalaya Forest Department). Garlic's current medical uses include preventing and treating cardiovascular disease by decreasing blood pressure and cholesterol, as an antibacterial, and as a cancer prevention agent, which is brief in **Table 1** (Londhe *et al.* 2011). It includes numerous bioactive components, including organic sulfides, saponins, phenolic compounds and polysaccharides. Organic sulfides such as allicin, alliin, diallyl sulfide, diallyl disulfide,

diallyl trisulfide, ajoene and S-allyl-cysteine are important bioactive components of garlic (Shang *et al.* 2019). The active ingredients are a group of complex sulfur-containing chemicals that are quickly absorbed, altered and metabolized (Ansari *et al.* 2023). It also contains wound-healing, antifungal, antidiabetic, antimicrobial, anti-inflammatory, antioxidant and hepatoprotective properties (Eidi *et al.* 2006; Ejaz *et al.* 2009; Shin *et al.* 2014; Li *et al.* 2016; Putnik *et al.* 2019).

***Allium cepa* L.**

A. cepa, or onion, is a culinary and therapeutic spice from the Amaryllidaceae family of monocotyledon (Alam *et al.* 2023). It has traditionally been utilized for its medicinal properties in treating various illnesses, including blood purification for athletes, scurvy prevention, wound healing, diuretic and pneumonia fighters (**Table 1**) (Teshika *et al.* 2019). It has a high concentration of phenolic compounds, mainly quercetin and its glycosides, phenolic acids, sulfur compounds (allicin), vitamins and minerals. The plant has several pharmacological effects such as anticancer, antidiabetic, antibacterial, cardioprotective and antioxidant properties (Yıkmiş *et al.* 2024). It has been used as a diuretic to minimize edema and arteriosclerosis by reducing blood pressure and preventing blood clots (Kumar *et al.* 2010).

Food synergy of traditional salad ingredients

Food synergy represents a theoretical framework for comprehending the interactions among various nutrients, their absorption processes and bioavailability within the human organism, which can yield either advantageous or detrimental outcomes. Research has shown that combining different fruits and vegetables like in a salad is more potent in combating several diseases than having it individually. This may be due to the combination of several phytochemicals present in certain foods with their specific targets (Natarajan 2019). Salads often serve as a harmonious blend of flavours and nutrients, with multiple foods coming together to give appropriate nourishment, integrated as a dish. The combination of aromatic chemicals, together with other vegetables and seeds, not only relieves monotony but also improves the health advantages of each component. We will now look at the combinations of basic ingredients in traditional salads of the above-mentioned plants.







‘*Sohsaw khleh bad Jamyrdoh*’ is a known salad of Meghalaya, the juicy, slightly sweet nature of tomatoes contrasts beautifully with the earthy, pungent flavor of fish mint. The synergistic effects of tomatoes' antioxidants and *H. cordata's* anti-inflammatory





properties lead to enhanced nitric oxide levels. Sesame seeds that were roasted and ground were added to the boiled bitter brinjal and served as an alternative side dish as they complemented the vegetable's milder bitter taste. *Solanum gilo* fruits have bioactive phytochemicals that are anti-inflammatory and antioxidants (Tchoupang *et al.* 2022). This explains why sesame seeds' fats and oils are of importance nutraceutical. Phytochemicals that are fat-soluble such as glycoalkaloids are made more bioactive by these oils helping in fatty composition and cholesterol reduction where vascular health is improved. A refreshing bitter '*khliang syiar* salad' of gotu kola balanced by the crunch and pungency of onions. The *C. asiatica* triterpenoids and quercetin in onions synergize to enhance blood flow and diminish arterial stiffness when consumed together. Quercetin is believed to promote the bioavailability of active constituents in *C. asiatica*, thereby amplifying their effectiveness in enhancing vascular function and reducing blood pressure. '*Jyllang*' is consumed raw as a single dish or sometimes with roasted tomato, with a mild garlic aroma and crunchiness that tantalises the senses, these chives offer a tastier alternative to traditional garlic. The bioactive constituents, such as sulfur compounds present in *A. tuberosum* and lycopene in tomatoes, show synergy in which sulfur compounds provide antioxidant defence and lycopene prevents vascular damage; the result is an increase in endothelial function coupled with blood pressure regulation mostly due to the synergism of antioxidant and vasoprotection.

Yet another salad, *sla-jarem*, is prepared by blanching the *sla-jarem* seasoned with garlic; it is a delicious salad of Meghalaya. *C. colebrookianum* has vasodilatory activity due to an increased synthesis of nitric oxide, which leads to lowering of blood pressure. Garlic, being an allyl sulfide with its rich allicin, is known for its ability to cause vasodilatation by raising nitric oxide levels and thereby reducing vascular resistance. The synergistic effect of both plants markedly enhances antihypertensive activity. '*Sohbaingon dieng* chutney' is a highly famous chutney in Meghalaya; the sour, juicy flavour, when combined with onion, creates a distinct flavour. Tree tomato and onions confer multiple health benefits when consumed together. Such species have been rich in potassium and quercetin to make it cardioprotective; it might even help alleviate hypertension (Vasco *et al.* 2009; Kumar *et al.* 2010). Antioxidants found within these species might potentially control the inflammation and oxidative stress mechanisms, which can be ascribed to the increase of blood pressure (Isla *et al.* 2022; Ykmiş *et al.* 2024). Research into traditional dietary practices has unearthed promising avenues for managing hypertension through the synergy of plant-based ingredients native to Meghalaya. Such combinations not only provide enhanced cardiovascular protection but also underline the significance of exploring traditional knowledge for innovative and

cost-effective hypertension management strategies. The list of the abovementioned antihypertensive plants, their vernacular names, the parts used for consumption, and their medicinal or culinary benefits are depicted in **Table 1**.

Table 1: Common medicinal plants of Meghalaya used in culinary diet.

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|  | <p>Scientific Name: <i>Houttuynia cordata</i> Thunb. Vernacular Name: <i>Jamyrdoh</i> Edible Parts: Whole plant The entire plant is eaten raw as a salad or cooked to lower blood sugar levels, sores, boils, and for blood purification.</p> |
|  | <p>Scientific Name: <i>Centella asiatica</i> L. Urb. Vernacular Name: <i>Bat-Khliang-Syiar</i> or <i>Bat-Moina</i> Edible Parts: Whole plant It is eaten raw or in a salad and is used to treat diarrhoea, dysentery, liver difficulties, nerve disorders and blood purification.</p> |
|  | <p>Scientific Name: <i>Solanum betaceum</i> Cav. Vernacular Name: <i>Sohbaingon</i> or <i>Sohsawdieng</i> Edible Parts: Fruits It is eaten fresh, crushed with milk or water, simmered in soups and sauces, or mixed into desserts and salads. The fruit with the peel is used as an antimicrobial/anti-inflammatory remedy to heal sore throats and irritated gums and decrease cholesterol.</p> |
|  | <p>Scientific Name: <i>Allium tuberosum</i> Rottler ex Spreng Vernacular Name: <i>Jyllang</i> Edible Parts: Whole plant It is eaten raw alongside daily meals known to treat blood pressure. It is also used for treating nocturnal emissions, abdominal pain, diarrhoea, sexual dysfunction, asthma, gastric ulcer, dyspepsia, and supporting kidney function.</p> |
|  | <p>Scientific Name: <i>Clerodendrum colebrookianum</i> Walp. Vernacular Name: <i>Sla Jarem</i> Edible Parts: Leaves Consuming the water after boiling the leaves for the treatment of high blood pressure, malaria, and liver problems, and application of the warmed leaf - paste to the affected area.</p> |
|  | <p>Scientific Name: <i>Solanum gilo</i> Raddi. Vernacular Name: <i>Soh-ngang-heh</i> Edible Parts: Fruits Fruits are consumed as a vegetable, carminative and sedative, in the treatment of colic and high blood pressure.</p> |

| | |
|---|--|
|  | <p>Scientific Name: <i>Allium sativum</i> L. Vernacular Name: <i>Rynsun</i> Edible Parts: Bulb It is combined with oil to treat coughs, colds, and respiratory tract infections. It can also be used to treat wound infection and gastrointestinal infections.</p> |
|  | <p>Scientific Name: <i>Allium cepa</i> L. Vernacular Name: <i>Piat</i> Edible Parts: Whole plant It is a culinary and therapeutic spice eaten raw or added to a salad. It has also been used for blood purification for athletes, scurvy prevention, wound healing, diuretic, and pneumonia.</p> |
|  | <p>Scientific Name: <i>Solanum lycopersicum</i> L. Vernacular Name: <i>Sohsaw</i> Edible Parts: Fruits It is consumed as a vegetable or in a raw salad form. Fresh juice is used to induce vomiting, reduce bleeding, cure furuncles and bites, act as a febrifuge, and for pregnant women to reduce water retention, cleanse kidneys and liver, and promote digestion.</p> |
|  | <p>Scientific Name: <i>Sesamum indicum</i> L. Vernacular Name: <i>Nei-iong</i> Edible Parts: Seeds The seeds are roasted and processed into powder for subsequent consumption in salads. Sesame seeds have traditionally been used as a folk treatment for a variety of ailments, including intestinal blockage, asthma, allergies, and eye diseases.</p> |

Conclusion

To date, CVDs remain one of the leading causes of death worldwide, it is necessary to look for alternative, more effective treatments. This paper delves into plant-based dietary approaches for reducing the burden of CVDs, with an emphasis on the possible advantages for people with hypertension. Simple salads or chutneys with a combination of tomatoes and fish mint or bitter brinjal and sesame seeds, gotu kola and onion, garlic chives and tomatoes, *Clerodendrum* and garlic, tamarillo and onion can be regarded as simple and natural ways of addressing hypertension. As noted, these plants are deeply rooted in local cuisine, providing a practical approach for cultural integration into dietary practices, which can encourage adherence to health-promoting dietary practices. The consumption of these plants not only aligns with regional dietary practices but also provides a foundation for integrating indigenous knowledge into modern hypertension management strategies. Consequently,

exploring these traditional plant combinations could yield novel, plant-based interventions tailored to the specific cardiovascular needs within Meghalaya, paving the way for future research in pharmacological applications. Research on combining phytochemicals from various plants can yield innovative treatment protocols that integrate traditional and modern medicine. This approach honours indigenous knowledge while conforming to modern health standards, creating a comprehensive intervention framework. Additionally, such integration can lead to culturally appropriate dietary guidelines that enhance local adoption, thereby improving health outcomes and acceptance. By bridging the gap between traditional practices and modern research, sustainable solutions for hypertension management and promoting cardiovascular health.

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