

Traditional Use of Medicinal Herbs in *Asteraceae* Family for Treatment of Hypertension: A Review

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ABSTRACT

Recently, arterial hypertension (AHT) or high blood pressure is considered as one of the most frequent illness condition around the world especially in developing countries. *Asteraceae* is a well-known family of flowering plants. So far the pharmacological and therapeutic properties of a large number of plants in this family have proven; therefore in the present study we decided to review the some plants of this family that are traditionally used to treat hypertension around the world. The obtained results of the present review investigation demonstrated that 29 medicinal herbs were found that traditionally used to treat hypertension around the world. The most parts of these plants are leave and root; whereas these medicinal herbs are most commonly used in countries of Asian and African such as Iran, Pakistan, India and South Africa, etc. The obtained findings revealed that medicinal herbs in *Asteraceae* family are globally used to treat and reduce hypertension. The obtained findings revealed that medicinal herbs in *Asteraceae* family are globally used to treat and reduce hypertension. This results suggested that the plants in this family may be considered as alternative agents in the treatment of hypertension; of course after the evaluation of their toxicity in clinical models; however further investigations are required to clear the accurate anti-hypertensive mechanisms as well as toxicity of these plants in human subjects.

Key words: Hypertension, Anti-hypertensive, Herbal medicines, *Asteraceae*, Traditional medicine

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INTRODUCTION

Recently, arterial hypertension (AHT) or high blood pressure is considered as one of the most frequent illness condition around the world especially in developing countries [1]. Based on the World Health Organization, AHT was defined as a health condition that causes a continuous increase in blood pressure (BP) inside the arteries of people [2]. Although the disease may be asymptomatic, it can have serious and even fatal complications such as heart failure, coronary artery disease, angina, myocardial infarction, development of thrombosis, and cerebral hemorrhage if treatment is not provided [3,4]. At present there are two main way to treat AHT around the world, (i) use of the synthetic drugs such as diuretics, beta blockers, calcium channel blockers, etc., (ii) changing lifestyle such as regular exercise, reducing salt intake, maintaining the ideal weight, etc. [5-7]. Since the use of these synthetic drugs has different side effects, the tendency toward the use of natural products such as

high-performance medicinal herbs and low complications is increasing among the world's people today [8-11].

Based on the previous reviews, there are a large number of medicinal herbs are applied to treat AHT which indicating considerable efficacy and lower side effects in comparison to the current synthetic agents [12-16]. *Asteraceae* is a well-known family of flowering plants. So far the pharmacological and therapeutic properties of a large number of plants in this family have proven [17]; therefore in the present study we decided to review the some plants of this family that are traditionally used to treat hypertension around the world.

MATERIALS AND METHODS

In this review, we used a number of databases such as Web of Science, PubMed, Google scholar EMBASE, Scopus and directory of open access journals (DOAJ) to recognize all published articles on the subject. Our search was carried out based on the combinations of the some key words and or their equivalents; "hypertension", "blood pressure", "antihypertensive", "ethnobotany", "medicinal plants", "traditional medicine", "*Asteraceae*", and also any individual herb name in this family cited in the hypertension literature. Moreover, "gray" or "opaque"

literature (technical reports, conference proceedings and dissertations) were not used in this review.

RESULTS

The obtained results of the present review investigation demonstrated that 29 medicinal herbs were found that traditionally used to treat hypertension around the

world. The most parts of these plants are leave and root; whereas these medicinal herbs are most commonly used in countries of Asian and African such as Iran, Pakistan, India and South Africa, etc. Table 1 shows the medicinal plants that traditionally used to treat hypertension around the world.

Table 1: The medicinal plants that traditionally used to treat hypertension around the world.

Plants	Growth form	Part(s) of used	Distinct
<i>Achillea millefolium</i> L.	Shrub	Shoot	[18]
<i>Allium ursinum</i> L.	Herb	Shoot	[19]
<i>Anthemis cotula</i> L.	Herb	Flower	[20]
<i>Artemisia afra</i> Jacq. ex Willd	Shrub	Leaves	[21,22]
<i>Artemisia annua</i> L.	Shrub	Flower	[23]
<i>Artemisia vulgaris</i> L.	Shrub	Leaves	[23]
<i>Artemisia parviflora</i> Roxb. ex D.Don	Shrub	Leaves	[24]
<i>Chrysocoma ciliata</i> L	Shrub	Leaves, roots	[22]
<i>Cichorium intybus</i> L.	Herb	Leaves	[23]
<i>Conyza scabrida</i> DC.	Shrub	Leaves	[21,25]
<i>Dicrothamnus rhinocerotis</i> (L.f.)	Shrub	Leaves, stem	[22]
<i>Dicoma anomala</i> (Sond).	Herb	Leaves, roots	[25,26]
<i>Dicoma capensis</i> Less.	Herb	Leaves, twigs, roots	[25]
<i>Eriocephalus africanus</i> L.	Shrub	Leaves	[21]
<i>Elytropappus rhinocerotis</i> (L.f.)	Shrub	Leaves	[21]
<i>Euryops abrotanifolius</i> (L.) DC.	Shrub	Leaves, stems	[22]
<i>Galinsoga parviflora</i> Cav.	Herb	Leaves	[27]
<i>Gundelia Tournefortii</i> L.	Herb	Root	[28]
<i>Helichrysum crispum</i> L.	Herb	Leaves, roots	[21]
<i>Helichrysum odoratissimum</i> L.	Herb	Leaves, roots	[29]
<i>Inula royleana</i> DC.	Herb	Leaves	[30]
<i>Nepeta erecta</i> (Royle ex Benth.)	Herb	Leaves	[31]
<i>Schkuhria pinnata</i> Lam.	Herb	Whole plant	[32]
<i>Senecio bupleuroides</i> D.C	Shrub	Leaves	[33]
<i>Senecio serratuloides</i> D.C	Herb	Leaves, roots	[34]
<i>Senecio inornatus</i> D.C	Herb/small shrub	Leaves, roots	[33]
<i>Silybum marianum</i> L. Gaertn.	Shrub	Flower, stem and root	[35]
<i>Tragopogon aureus</i> Boiss.	Herb	Leaves and fruit	[35]
<i>Tridax procumbens</i> L.	Herb	Leaves	[36]

DISCUSSION

Hypertension as one of the most prevalent cardiovascular diseases considered a significant public health concern, with a worldwide frequency of nearly 40%. Hypertension is defined a rise in systolic blood pressure ≥ 140 mm/hg; while diastolic blood pressure ≥ 90 mm/Hg distinctly or together [37-39].

According to the available documents, humans used medicinal plants for thousands of years to treat their illnesses around the world. In recent years, the use of multiple medications for the treatment of hypertension, as well as increased reports of some serious side effects in the use of these drugs has led to more interest among people around the world in the use of natural products, especially medicinal plants, in recent years [40]. In the

present study we decided to review the some plants of *Asteraceae* family that are traditionally used to treat hypertension in Iran. The obtained results of the present review investigation demonstrated that 29 medicinal herbs in *Asteraceae* family were traditionally used to treat hypertension around the world. The most parts of these plants are leave and root; whereas these medicinal herbs are most commonly used in countries of Asian and African such as Iran, Pakistan, India and South Africa, etc.

Based on the previous phytochemical investigations on plants from this family, the main compounds were flavonoids, terpenes, polyphenols, and flavonoids. Reviews have shown that polyphenols have been considered as a therapeutic agent against a number of diseases such as cardiovascular; whereas it can play a preventive role for hypertension [41-45]. Studies also prove that flavonoides as one of the main compounds in the plants of *Asteraceae* family were mainly related with lower coronary heart disease mortality [46].

Sesquiterpene as terpenes derivatives which are present in *Asteraceae* family have more than a few thousand compounds that these components are related a large number of biological and pharmacological properties such as antitumor, antibacterial, cardiotoxic and anti-inflammatory effects and relax smooth muscles [47-50].

Another component that exists in plants of *Asteraceae* family is polystyrenes that containing nearly 1500 secondary metabolites. So far several biological activities have been related to these components Polystyrenes exert considerable toxic side effects against fungi, bacteria, breast carcinoma cells. These compounds also exert anti-platelet aggregation properties [51,52]. Therefore, it can suggest that anti-hypertensive activity of these plants in *Asteraceae* family is associated to these components.

CONCLUSION

The obtained findings revealed that medicinal herbs in *Asteraceae* family are globally used to treat and reduce hypertension. This results suggested that the plants in this family may be considered as alternative agents in the treatment of hypertension; of course after the evaluation of their toxicity in clinical models; however further investigations are required to clear the accurate anti-hypertensive mechanisms as well as toxicity of these plants in human subjects.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

REFERENCES

1. Leng GC, Lee AJ, Fowlers FGR, et al. Incidence, natural history and cardiovascular events in symptomatic and asymptomatic peripheral arterial disease in the general population. *Int J Epidemiol* 1996; 25:1172-81.

2. www.who.int/mediacentre/news/releases/2012/world_health_statistics_20120516/en/
3. Lawes CM, Vander HS, Rodgers A. Global burden of blood-pressure-related disease, 2001. *Lancet* 2008; 371:1513-8.
4. MacMahon S, Peto R, Collins R, et al. Blood pressure, stroke, and coronary heart disease: Part 1, prolonged differences in blood pressure: prospective observational studies corrected for the regression dilution bias. *Lancet* 1990; 335:765-74.
5. Brook RD, Appel LJ, Rubenfire M, et al. Beyond medications and diet: Alternative approaches to lowering blood pressure. *J Hypertens* 2013; 61:1360-83.
6. Sarafidis PA, Li S, Chen SC, et al. Hypertension awareness, treatment, and control in chronic kidney disease. *Am J Med* 2008; 121:322-40.
7. Appel LJ, Champagne CM, Harsha DW, et al. Effects of comprehensive lifestyle modification on blood pressure control: Main results of the PREMIER clinical trial. *JAMA* 2003; 289:2083-93.
8. Neal B, MacMahon S, Chapman N. Effects of ACE inhibitors, calcium antagonists, and other blood-pressure-lowering drugs: Results of prospectively designed overviews of randomised trials. *Lancet* 2000; 356:1955-64.
9. Mitaliya KD, Bhatt DC, Patel NK, et al. Herbal remedies used for hair disorders by tribals and rural folk in Gujarat. *Indian J Tradit Know* 2003; 2:389-92.
10. Snyder FJ, Dundas ML, Kirkpatrick C, et al. Use and safety perceptions regarding herbal supplements: A study of older persons in southeast Idaho. *J Nutr Elder* 2009; 28:81-95.
11. Tekol Y. The medieval physician Avicenna used an herbal calcium channel blocker, *Taxus baccata* L. *Phytother Res* 2007; 21:701-2.
12. Mensah JK, Okoli RI, Turay AA, et al. Phytochemical analysis of medicinal plants used for the management of hypertension by Esan people of Edo state, Nigeria. *Ethnobot Leaflets* 2009; 10:7.
13. World Health Organization. Adherence to long-term therapies: Evidence for action. WHO, Geneva, Switzerland, 2003.
14. Sharma I, Parashar B, Dhamija HK, et al. An ayurvedic arena for hypertension treatment. *Asian J Pharmaceut Res* 2012; 2:54-8.
15. Stockwell C. Nature's pharmacy: A history of plants and healing. Random House, London, UK 1988.
16. World Health Organization. WHO Traditional Medicine Strategy: 2014-2023. WHO, Geneva, Switzerland, 2013.
17. Bessada AMF, Barriera J, Oliviera M. *Asteraceae* species with most prominent bioactivity and

- their potential applications: A review. *Ind Crops Prod* 2015; 76:604-15.
18. Zolfaghari A, Adeli A, Mozafarian V, et al. Identification of medicinal plants and indigenous knowledge of local people Arasbaran. *J Med Arum Plants* 2013; 28:534-50.
 19. Asadi-Samani M, Kafash-Farkhad N, Azimi N, et al. Medicinal plants with hepatoprotective activity in Iranian folk medicine. *Asian Pac J Trop Biomed* 2015; 5:146-57.
 20. Alavi SZ, Rabiei E, Saeedi-Goraghani HR, et al. Alternative and traditional uses of medicinal plants of North of Iran. *J Herbal Drugs* 2011; 2:113-20.
 21. Thring TSA, Weitz FM. Medicinal plant use in the Bredasdorp/Elim region of the Southern Overberg in the Western Cape province of South Africa. *J Ethnopharmacol* 2006; 103:261-75.
 22. Davids D, Gibson D, Johnson Q. Ethnobotanical survey of medicinal plants used to manage high blood pressure and type 2 diabetes mellitus in Bitterfontein, Western Cape Province, South Africa. *J Ethnopharmacol* 2016; 194:755-66.
 23. Ahmad L, Semotiuk A, Zafar M, et al. Ethnopharmacological documentation of medicinal plants used for hypertension among the local communities of DIR Lower, Pakistan. *J Ethnopharmacol* 2015; 175:138-46.
 24. Ahmad S, Ali A, Beg H, et al. Ethnobotanical studies on some medicinal plants of Booni Valley, District Chitral Pakistan. *Pak J Weed Sci Res* 2006; 12:183-90.
 25. Van Wyk B, Van Oudshoorn B, Gericke N. Medicinal plants of South Africa. Pretoria: Briza Publications 1997.
 26. Moffett RO. Sesotho plant and animal names and plants used by the Basotho. Bloemfontein: Sun Press 2010.
 27. Ramesar S, Baijnath H, Govender T, et al. Angiotensin I-converting enzyme inhibitor activity of nutritive plants in KwaZulu-Natal. *J Med Food* 2008; 11:331-6.
 28. Arasan S, Kaya I. Some important plants belonging to Asteraceae family used in folkloric medicine in Savur (Mardin/Turkey) area and their application areas. *J Food Nutr Res* 2015; L5:337-40.
 29. Olorunnisola OS, Bradley G, Afolayan AJ. Ethnobotanical information on plants used for the management of cardiovascular diseases in Nkonkobe Municipality. *S Afr J Med Plants Res* 2011; 5:4256-60.
 30. Haq F, Ahmad H, Alam M. Traditional uses of medicinal plants of Nandiar Khuwarr catchment (District Battagram), Pakistan. *J Med Plants Res* 2011; 5:39-48.
 31. Amjad MS, Qaeem MF, Ahmad I, et al. Descriptive study of plant resources in the context of the ethnomedicinal relevance of indigenous flora: A case study from Toli Peer National Park, Azad Jammu and Kashmir, Pakistan. *PLoS One* 2017; 12:e0171896.
 32. Semenya S, Potgieter M, Tshisikhawe M, et al. Medicinal utilization of exotic plants by Bapedi traditional healers to treat human ailments in Limpopo province, South Africa. *J Ethnopharmacol* 2012; 144: 646-55.
 33. Hutchings A, Scott AH, Lewis G, et al. Zulu medicinal Plants: An Inventory. Pietermaritzburg: University of Natal Press, Pietermaritzburg 1996.
 34. DeWet H, Ramulondi M, Ngcobo ZN. The use of indigenous medicine for the treatment of hypertension by a rural community in northern Maputaland, South Africa. *S Afr J Bot* 2016; 103:78-88.
 35. Khodayari H, Amani SH, Amiri H. Ethnobotanical study of North east of Khuzistan province. *Eco Phytochem J Med Plants* 2013; 4:12-26.
 36. Kone WM, Kande B. Qualitative analysis of the pyrrolizidine alkaloids from 11 Asteraceae and Boraginaceae used in traditional medicine in Cote d'Ivoire. *Res J Phytochem* 2012; 6:75-83.
 37. Poulter NR, Prabhakaran D, Caulfield M. Hypertension. *Lancet* 2015; 386:801-12.
 38. Chow CK, Teo KK, Rangarajan S, et al. Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high, middle, and low-income countries. *J Am Med Ass* 2013; 310:959-68.
 39. James PA, Oparil S, Carter BL, et al. Evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the eighth joint national committee (JNC 8). *JAMA* 2014; 311:507-20.
 40. Nole T, Lionel TW, Cedrix TS, et al. Ethnomedical and ethnopharmacological study of plants used for potential treatments of diabetes and arterial hypertension by indigenous people in three phytogeography regions of Cameroon. *Diabetes Case Rep* 2016; 110:2.
 41. Tabassum N, Ahmad F. Role of natural herbs in the treatment of hypertension. *Pharmacogn Rev* 2011; 5:30.
 42. Ogah O, Watkins CS, Ubi BE, et al. Phenolic compounds in Rosaceae fruit and nut crops. *J Agric Food Chem* 2014; 62:9369-86.
 43. Dekdouk N, Malafronte N, Russo D, et al. Phenolic compounds from *Olea europaea* L. possess antioxidant activity and inhibit carbohydrate metabolizing enzymes in vitro. *Evid Based Complement Alternat Med* 2015; 2015:684925.
 44. Narasimhulu G, Reddy KK, Mohamed J. The genus *Polygonum* (Polygonaceae): An ethnopharmacological and phytochemical perspectives-review. *J Pharm Pharm Sci* 2014; 6:21-45.

45. Muley B, Khadabadi S, Banarase N. Phytochemical constituents and pharmacological activities of *Calendula officinalis* Linn (Asteraceae): A review. *Trop J Pharm Res* 2009; 8:455-65.
46. Peterson JJ, Dwyer JT, Jacques PF, et al. Associations between flavonoids and cardiovascular disease incidence or mortality in European and US populations. *Nutr Rev* 2012; 70:491-508.
47. Rodriguez E, Towers G, Mitchell J. Biological activities of sesquiterpene lactones. *Phytochemistry* 1976; 15:1573-80.
48. Emerenciano VD, Ferreira ZS, Kaplan MA, et al. A chemosystematic analysis of tribes of Asteraceae involving sesquiterpene lactones and flavonoids. *Phytochemistry* 1987; 26:3103-15.
49. Asadi-Samani M, Rafieian-Kopaei M, Azimi N. *Gundelia*: A systematic review of medicinal and molecular perspective. *Pak J Biol Sci* 2013; 16:1238-47.
50. Andrade LN. Sesquiterpenes from essential oils and anti-inflammatory activity. *Nat Prod Commun* 2015; 10:1767-74.
51. Negri R. Polyacetylenes from terrestrial plants and fungi: Recent phytochemical and biological advances. *Fitoterapia* 2015; 106:92-109.
52. Chen Y, Peng S, Luo Q, et al. Chemical and pharmacological progress on polyacetylenes isolated from the family apiaceae. *Chem Biodivers* 2015; 12:474-502.