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Ethnobotanical Study of Medicinal Plants Traditionally Used as Cardiac Tonics in Khorramabad County, Lorestan Province, Iran

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ABSTRACT

Medicinal plants constitute an important component of traditional healthcare systems and indigenous knowledge worldwide. In many cultures, local communities have relied on plant-based remedies for managing various health conditions, including cardiovascular and metabolic disorders. The present study aimed to document the medicinal plants traditionally used for cardiovascular and metabolic health-related conditions in Khorramabad County, Lorestan Province, western Iran. A descriptive ethnobotanical survey was conducted among 40 traditional healers and knowledgeable individuals with experience in medicinal plant identification and use. Ethnobotanical data were collected from October 2025 to March 2026 through structured interviews using a pre-designed questionnaire. Information on scientific names, botanical families, vernacular names, plant parts utilized, preparation methods, administration routes, and traditional applications related to cardiovascular and metabolic conditions was recorded. A total of 18 medicinal plant species belonging to 14 botanical families were documented. The most frequently reported species included *Morus alba*, *Berberis integerrima*, *Pistacia atlantica*, *Capparis spinosa*, *Urtica dioica*, and *Valeriana officinalis*. Leaves, aerial parts, and roots were the most commonly utilized plant materials, while infusion, decoction, and oral administration were the predominant preparation and application methods. Reported traditional applications included management of elevated blood pressure, regulation of blood glucose, improvement of lipid metabolism, and general support of cardiovascular health. The documented diversity of medicinal plants and associated traditional practices highlights the richness of indigenous knowledge related to cardiovascular and metabolic health in Khorramabad County. These findings provide valuable baseline information for future phytochemical, pharmacological, and clinical investigations aimed at evaluating the biological activities, mechanisms of action, safety, and potential therapeutic applications of these traditionally used plants.

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Introduction

Cardiovascular disease (CVDs) remains among the leading global public health challenges and encompasses a broad spectrum of conditions, including coronary artery disease, heart failure, cardiac rhythm disorders, and hypertension-related diseases (Gaziano et al., 2006). Population ageing, lifestyle changes, unhealthy dietary patterns, and the increasing prevalence of metabolic risk factors have further heightened the need for effective preventive and complementary approaches to cardiovascular health management (Nabel, 2003). Within this context, medicinal plants have long played an important role in traditional healthcare systems. Across many communities, knowledge concerning the use of plants for maintaining health and managing cardiovascular complaints has been preserved and transmitted across generations (Olvera Lopez et al., 2026).

In traditional medicine, numerous plants have been used to strengthen perceived cardiac function, alleviate palpitations, support blood pressure regulation, improve circulation, and relieve symptoms associated with perceived cardiac weakness or discomfort (Hao et al., 2017). These plants may be considered within the broader concept of cardiac tonics (Liu & Huang, 2016), a term that, in ethnobotanical contexts, refers to plants traditionally consumed to strengthen or support cardiac function and the circulatory system (Odukoya et al., 2022). Many medicinal plants contain diverse bioactive constituents, including flavonoids, terpenoids, alkaloids, phenolic compounds, and other secondary metabolites. Experimental studies have associated some of these constituents with antioxidant, anti-inflammatory, vasomotor, and other potentially relevant cardiovascular activities (Odukoya et al., 2022). However, traditional use should not be regarded as evidence of clinically established efficacy or safety. Systematic documentation of traditional practices is therefore important not only for preserving indigenous knowledge but also for identifying medicinal plants that may warrant further pharmacological and clinical investigations (Rivera et al., 2005).

Ethnobotany, as an interdisciplinary field concerned with human-plant relationships, plays

an important role in identifying, documenting, and analyzing indigenous knowledge concerning medicinal plants (Martin, 2004). The value of ethnobotanical investigations extends beyond the compilation of plant species lists. Such studies can capture culturally embedded information, including vernacular names, plant parts used, methods of preparation and administration, therapeutic applications, and patterns of knowledge transmission within local communities (Cotton, 1996). Despite advances in modern medicine, traditional plant-based knowledge in many communities is increasingly vulnerable to erosion and loss. Ethnobotanical research can therefore simultaneously contribute to the preservation of biological and cultural heritage and the identification of plant species with potential value for subsequent scientific investigation (Cotton, 1996).

Lorestan Province is considered an important region for ethnobotanical research in Iran because of its considerable climatic and topographical diversity, rich vegetation, and long-standing tradition of medicinal plant use (Mehrnia et al., 2021). Khorramabad County is characterized by substantial plant diversity and communities with considerable practical knowledge and experience in the traditional use of plant resources. These characteristics make the region a valuable setting for documenting local ethnobotanical knowledge. However, information on plants specifically used in traditional medicine in the region to strengthen or support cardiovascular health remains insufficiently documented and requires systematic investigation.

Accordingly, this study was undertaken to identify and document medicinal plants traditionally used as cardiac tonics in Khorramabad County, Lorestan Province, Iran. By systematically documenting local knowledge concerning these plants, this study aimed to provide an evidence-based account of traditional practices related to cardiac and cardiovascular health in the region. The findings may also provide a foundation for future investigations into the phytochemical constituents, pharmacological mechanisms, therapeutic potential, and safety of the documented medicinal plants.

Methods

Study Area and Study Period

This ethnobotanical survey was conducted in Khorramabad County, Lorestan Province, western Iran, from October 2025 to March 2026. The study area was selected because of its considerable floristic diversity, diverse ecological habitats, and the continued use of medicinal plants by local communities as part of traditional healthcare practices. The geographical location of Khorramabad County is shown in Figure 1.



Figure 1. Geographical map showing the location of Khorramabad County in Lorestan Province, Iran.

Study Design and Data Collection

A descriptive ethnobotanical approach was employed to document the medicinal plants traditionally used by local communities for cardiovascular and metabolic health-related conditions in Khorramabad County. Ethnobotanical data were collected through face-to-face, semi-structured interviews using a pre-designed questionnaire developed based on the study objectives.

The questionnaire included information on vernacular and scientific plant names, botanical families, plant parts utilized, preparation methods, routes of administration, and reported traditional applications associated with cardiovascular and metabolic conditions, including blood pressure regulation, blood glucose management, lipid disorders, and general cardiovascular health.

A total of 40 knowledgeable informants, including traditional medicine practitioners and individuals experienced in medicinal plant use, participated in this study. Informants were selected using a combination of purposive and snowball sampling

techniques. Initial participants were identified based on their recognized knowledge and experience in traditional plant-based healthcare, while additional knowledgeable individuals were recruited through recommendations from previously interviewed participants.

The inclusion criteria were as follows: (1) substantial experience in the identification, collection, and use of medicinal plants; (2) familiarity with traditional applications of medicinal plants for health-related conditions; and (3) willingness to participate and provide ethnobotanical information.

Sociodemographic Characteristics of Informants

For each informant, demographic and background information was recorded, including sex, age, educational level, occupation, place of residence, and years of experience with medicinal plants. These variables were considered relevant for understanding patterns of traditional knowledge distribution, acquisition, and transmission within the local community.

Plant Collection and Identification

Medicinal plants reported during the interviews were collected based on informant knowledge, local descriptions, and direct field observations. Botanical identification was conducted using standard floristic references and taxonomic literature, and species identification was confirmed based on diagnostic morphological characteristics.

For each documented species, the scientific name, botanical family, vernacular name, plant part used, preparation method, administration route, and reported traditional applications were recorded. Where applicable, voucher specimens should be prepared and deposited in a recognized herbarium for future references.

Ethical Considerations

The study was conducted in accordance with the ethical principles of ethnobotanical research. Before each interview, the participants were informed about the objectives, procedures, and scientific purpose of the study. Written or verbal informed consent was obtained prior to data collection. Participation was voluntary, and the confidentiality of the participants' personal

information was maintained. The collected ethnobotanical information was used exclusively for scientific research purposes.

Results

Socio-demographic characteristics of informants, including age, gender, education level, occupation, and years of experience with medicinal plants, were recorded during the interviews (Table 1).

Table 1. Socio-demographic characteristics of informants participating in the ethnobotanical survey (n = 40)

Variable	Category	n	%
Gender	Male	28	70.0
	Female	12	30.0
Age group (years)	30–50	14	35.0
	51–70	18	45.0
	>70	8	20.0
Educational level	No formal education	10	25.0
	Primary education	16	40.0
	Secondary education	10	25.0
	University education	4	10.0
Occupation	Traditional healer	12	30.0
	Farmer	20	50.0
	Other occupations*	8	20.0
Experience with medicinal plants	<10 years	6	15.0
	10–30 years	18	45.0
	>30 years	16	40.0

*herbal collectors, livestock keepers, etc.

The ethnobotanical survey documented 18 medicinal plant species belonging to 14 botanical families that are traditionally used as cardiac tonics in Khorramabad County. The complete ethnobotanical information on the documented species is presented in Table 2.

Various plant parts have been reported for therapeutic use, including leaves, roots, stems, flowers, fruits, bulbs, and aerial parts. Herbal infusions and decoctions are the most frequently reported methods of preparation, while direct oral consumption of plant materials has also been documented in some cases.

The most frequently reported traditional application was blood pressure control, followed by blood glucose regulation, metabolic disorder management, and cardiovascular support. These findings demonstrate the diversity of indigenous

knowledge concerning the traditional use of medicinal plants for cardiac and cardiovascular health in Khorramabad County.

Table 2 provides detailed ethnobotanical information on the documented species, including their scientific names, botanical families, plant parts used, traditional methods of preparation and administration, and reported cardiovascular-related uses.

Discussion

The present study documented medicinal plants traditionally associated with cardiovascular health in Khorramabad County, Lorestan Province, western Iran. A total of 18 plant species belonging to 14 botanical families were recorded, demonstrating the richness of local ethnobotanical knowledge related to cardiovascular healthcare. Unlike general medicinal plant inventories, this study specifically focused on plants traditionally perceived by local communities as cardiac tonics and cardiovascular remedies, providing a targeted framework for future ethnopharmacological research.

The predominance of plants traditionally used for blood pressure regulation, blood glucose management, and metabolic disorders indicates that local perceptions of cardiovascular health extend beyond direct cardiac conditions and incorporate major physiological factors associated with cardiovascular risk. Similar patterns have been reported in ethnobotanical studies from Iran, where medicinal plants are frequently used for hypertension, diabetes, lipid abnormalities, and cardiovascular protection (Baharvand et al., 2016). This reflects the holistic nature of traditional healthcare systems, in which cardiovascular well-being is often considered interconnected with metabolic balance and general health status. Nevertheless, traditional applications represent cultural knowledge and therapeutic beliefs rather than evidence of confirmed clinical efficacy and therefore require validation through pharmacological and clinical investigations. The occurrence of botanical families, such as *Apiaceae*, *Amaryllidaceae*, and *Rosaceae*, may be related to the floristic diversity and ecological characteristics of the Zagros region.

Table 2. Ethnobotanical information on medicinal plants traditionally used as cardiac tonics in Khorramabad County, Lorestan

Scientific name	Plant family (APG IV)	Plant parts used	Traditional preparation methods	Reported traditional uses
<i>Morus alba</i> L.	Moraceae	Leaves, fruits	Infusion; oral consumption	Traditionally used for blood pressure regulation and cardiovascular health support
<i>Berberis integerrima</i> Bunge	Berberidaceae	Roots, stems	Decoction	Traditionally used for blood pressure regulation and metabolic disorders
<i>Pistacia atlantica</i> Desf.	Anacardiaceae	Gum, leaves	Decoction; oral consumption	Traditionally used for diabetes-related conditions and cardiovascular health support
<i>Capparis spinosa</i> L.	Capparaceae	Roots, leaves	Decoction	Traditionally used for blood glucose regulation and metabolic health
<i>Urtica dioica</i> L.	Urticaceae	Aerial parts	Infusion; decoction	Traditionally used for metabolic disorder management
<i>Valeriana officinalis</i> L.	Caprifoliaceae	Roots	Infusion; decoction	Traditionally used for stress-related conditions and cardiovascular support
<i>Melilotus officinalis</i> (L.) Pall.	Fabaceae	Aerial parts	Infusion	Traditionally used for cardiovascular health support
<i>Nectaroscordeum tripedale</i> (Trautv.) Grossh.	Amaryllidaceae	Bulbs	Oral consumption; decoction	Traditionally used for blood glucose regulation and cardiovascular support
<i>Nectaroscordeum koelzii</i> (Wendelbo) K. Persson	Amaryllidaceae	Bulbs	Oral consumption; decoction	Traditionally used for blood glucose regulation and cardiovascular support
<i>Falcaria vulgaris</i> Bernh.	Apiaceae	Aerial parts	Oral consumption; infusion	Traditionally used for blood pressure regulation
<i>Smyrniun cordifolium</i> Boiss.	Apiaceae	Aerial parts	Oral consumption; decoction	Traditionally used for blood pressure regulation
<i>Crocus haussknechtii</i> Boiss. & Reut.	Iridaceae	Flowers	Infusion	Traditionally used for blood pressure regulation
<i>Ziziphus spina-christi</i> (L.) Desf.	Rhamnaceae	Leaves, fruits	Infusion; oral consumption	Traditionally used for blood pressure regulation and cardiovascular support
<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn.	Rhamnaceae	Leaves, fruits	Infusion; oral consumption	Traditionally used for blood pressure regulation and cardiovascular support
<i>Allium ursinum</i> L.	Amaryllidaceae	Leaves, bulbs	Oral consumption; decoction	Traditionally used for blood pressure regulation and vascular health support
<i>Tragopogon caricifolius</i> Boiss.	Asteraceae	Roots, aerial parts	Oral consumption; decoction	Traditionally used for blood pressure regulation
<i>Anethum graveolens</i> L.	Apiaceae	Leaves, seeds	Infusion; oral consumption	Traditionally used for blood pressure regulation and stress-related conditions
<i>Prunus scoparia</i> (Spach) C.K.Schneid.	Rosaceae	Stems, leaves	Decoction	Traditionally used for blood pressure regulation

Similar ethnobotanical studies in western Iran have demonstrated that regional differences in medicinal plant composition are shaped by ecological factors, including climate, vegetation type, habitat accessibility, and species availability, as well as cultural factors such as historical practices and knowledge transmission pathways (Baharvand Ahmadi et al., 2023). Comparable patterns have been reported from Turkey, Iraq, and the Mediterranean regions, where communities often target similar health conditions but select different plant species according to their local

ecological and cultural contexts (Özdemir & Alpınar, 2015).

Several documented genera, including *Morus*, *Berberis*, *Allium*, and *Crocus*, have received scientific attention because of their diverse phytochemical profiles, including phenolic compounds, flavonoids, alkaloids, and sulfur-containing metabolites. Previous investigations have reported antioxidant, hypoglycemic, anti-inflammatory, and vascular-related activities in species belonging to these genera (Memete et al., 2022). However, the presence of bioactive

compounds or similarity between traditional use and reported pharmacological effects does not establish therapeutic effectiveness. Future investigations integrating phytochemical profiling, bioactivity-guided studies, toxicity evaluation, and clinical research are required to determine their actual therapeutic potential.

The diversity of plant parts used, including leaves, aerial parts, roots, bulbs, and fruits, reflects the adaptive strategies of local communities in utilizing the available plant resources. The frequent use of leaves and aerial parts is consistent with many ethnobotanical studies, as these organs are generally more accessible and may allow greater regeneration than the destructive harvesting of roots or bulbs (Rivera et al., 2005). Nevertheless, differences in the distribution of secondary metabolites among plant organs emphasize the importance of investigating specific plant parts traditionally used, rather than assuming equivalent biological activity across different tissues.

Traditional preparation methods, particularly infusion and decoction, represent practical approaches developed within local healthcare systems. These methods may facilitate the extraction of water-soluble compounds; however, factors such as extraction duration, temperature, plant material quantity, and preparation procedures can substantially influence the chemical composition and biological properties of herbal preparations (Ananthanarayan et al., 2019). Therefore, replication of traditional preparation methods should be considered when evaluating the pharmacological relevance of ethnobotanically documented species.

The findings of this study are consistent with previous ethnobotanical investigations conducted in Iran and other regions, where medicinal plants are commonly used for cardiovascular-related conditions. Studies from western Iran have reported species associated with blood pressure regulation, metabolic disorders, and cardiovascular support (Baharvand Ahmadi et al., 2023). Similar therapeutic categories have been documented in Pakistan, South Africa, and Brazil (Menetrier et al., 2020, Olorunnisola et al., 2011). The recurrence of cardiovascular-related uses across geographically distant regions may reflect the global importance of these health

concerns; however, differences in plant species selection are likely determined by regional biodiversity, accessibility of medicinal resources, cultural preferences, and historical knowledge exchange.

The present study contributes to the documentation and preservation of indigenous ethnobotanical knowledge in western Iran by providing a focused inventory of medicinal plants associated with cardiovascular health. Species frequently recognized by informants may serve as priorities for future investigation, particularly concerning mechanisms related to oxidative stress, vascular function, inflammation, and metabolic regulation. Integration of traditional knowledge with modern pharmacological approaches may facilitate the identification of valuable natural resources while supporting the conservation of local biocultural heritage.

Several limitations should be acknowledged. The study was conducted in a single county with a relatively small number of informants ($n = 40$), which may limit the transferability of the findings to other regions. Furthermore, the use of purposive and snowball sampling may introduce selection bias toward individuals with greater medicinal plant knowledge. The collected information was based on self-reported traditional knowledge and may, therefore, be influenced by recall bias. In addition, the efficacy, toxicity, dosage, and mechanisms of action of these compounds have not been experimentally evaluated. The absence of quantitative ethnobotanical indices, including Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL), limits direct comparison with other ethnobotanical investigations.

Overall, the findings demonstrate that traditional cardiovascular healthcare practices in Khorramabad represent a dynamic interaction among plant biodiversity, ecological conditions, cultural practices, and accumulated local experience. The documented species provide valuable starting points for future scientific research; however, maintaining a clear distinction between ethnobotanical knowledge and clinically validated therapeutic effects remains essential.

Conclusion

The present study documented the diversity of medicinal plants traditionally associated with cardiovascular health in Khorramabad County, Lorestan Province, Iran. The recorded species are mainly used for blood pressure regulation, blood glucose control, metabolic disorder management, and cardiovascular support. Leaves, aerial parts, and roots were the most frequently used plant parts, and infusion and decoction were the predominant preparation methods. These findings highlight the importance of indigenous knowledge in identifying plant resources with potential relevance to cardiovascular health. However, traditional use alone does not confirm its therapeutic efficacy or safety. Further phytochemical, pharmacological, toxicological, and clinical investigations are required to validate these traditional applications and to clarify their mechanisms of action. Documenting this knowledge contributes to the preservation of local ethnobotanical heritage and provides a foundation for future research on plant-based approaches to cardiovascular health.

Declarations Conflict of Interest

The authors declare no conflicts of interest.

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Consent for Publications

The authors certify that that this work in its final form has been thoroughly reviewed and approved for publication.

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Ethical Considerations

This study was performed in line with the principles of the Declaration of Helsinki.

AI Use Disclosure

The authors declare that AI tools were not used to generate or develop the scientific content of this manuscript. AI was used solely for English language editing, grammar correction, and improving sentence clarity and readability. The authors take full responsibility for the final content.

References

- Ananthanarayan, L., Dubey, K. K., Muley, A. B., & Singhal, R. S. (2019). Indian traditional foods: Preparation, processing and nutrition. In *Traditional foods: history, preparation, processing and safety* (pp. 127-199). Cham: Springer International Publishing.
- Baharvand Ahmadi, B., Khajoei Nejad, F., Papi, S. and Eftekhari, Z. (2023). Phytotherapy for heart tonic: An ethnobotanical study in Dehloran City, Ilam Province, Western Iran. *Caspian Journal of Environmental Sciences*, 1-5. doi:10.22124/cjes.2023.6192.
- Cotton, C. M. (1996). *Ethnobotany: principles and applications*, Chichester:, John Wiley & Sons.
- Gaziano, T., Reddy, K. S., Paccaud, F., Horton, S. and Chaturvedi, V. (2006). Cardiovascular Disease. In: Jamison, D. T., Breman, J. G., Measham, A. R., Alleyne, G., Claeson, M., Evans, D. B., et al. (eds.) *Disease Control Priorities in Developing Countries*. Washington (DC) New York: The World Bank Oxford University Press.

- Hao, P., Jiang, F., Cheng, J., Ma, L., Zhang, Y. and Zhao, Y. (2017). Traditional chinese medicine for cardiovascular disease: Evidence and potential mechanisms. *Journal of the American College of Cardiology*, 69(24), 2952-2966. doi:10.1016/j.jacc.2017.04.041.
- Liu, C. and Huang, Y. (2016). Chinese herbal medicine on cardiovascular diseases and the mechanisms of action. *Frontiers in Pharmacology*, 7 - 2016. doi:10.3389/fphar.2016.00469.
- Martin, G. J. (2004). *Ethnobotany: A Methods Manual*, Earthscan.
- Mehrnia, M., Akaberi, M., Amiri, M. S., Nadaf, M. and Emami, S. A. (2021). Ethnopharmacological studies of medicinal plants in central Zagros, Lorestan Province, Iran. *Journal of Ethnopharmacology*, 280, 114080. doi:10.1016/j.jep.2021.114080.
- Memete, A. R., Timar, A. V., Vuscan, A. N., Miere Groza, F., Venter, A. C. and Vicas, S. I. (2022). Phytochemical composition of different botanical parts of morus species, health benefits and application in food industry. *Plants (Basel)*, 11(2). doi:10.3390/plants11020152.
- Menetrier, J. V., Bonkoski, V. R., Medeiros, K. A., Estevan, D. A., Palozi, R. a. C., Lívero, F., et al. (2020). Ethnomedicinal plants used for the treatment of cardiovascular diseases by healers in the southwestern state of paran , brazil, and their validation based on scientific pharmacological data. *Journal of Religion and Health*, 59(6), 3004-3036. doi:10.1007/s10943-019-00960-1.
- Nabel, E. G. (2003). Cardiovascular disease. *N Engl J Med*, 349(1), 60-72. doi:10.1056/NEJMra035098.
- Odukoya, J. O., Odukoya, J. O., Mmutlane, E. M. and Ndinteh, D. T. (2022). Ethnopharmacological study of medicinal plants used for the treatment of cardiovascular diseases and their associated risk factors in sub-saharan africa. *Plants (Basel)*, 11(10). doi:10.3390/plants11101387.
- Olorunnisola, O., Bradley, G. and Afolayan, A. (2011). Ethnobotanical information on plants used for the management of cardiovascular diseases in Nkonkobe Municipality, South Africa. *J. Med. Plants Res*, 5(17), 4256-4260.
- Olvera Lopez, E., Ballard, B. D. and Jan, A. (2026). Cardiovascular Disease. *StatPearls*. Treasure Island (FL): StatPearls Publishing.
-  zdemir, E. and Alpınar, K. (2015). An ethnobotanical survey of medicinal plants in western part of central Taurus Mountains: Aladaglar (Nigde - Turkey). *Journal of Ethnopharmacology*, 166, 53-65. doi:10.1016/j.jep.2015.02.052.
- Rivera, D., Obon, C., Inocencio, C., Heinrich, M., Verde, A., Fajardo, J., et al. (2005). The ethnobotanical study of local Mediterranean food plants as medicinal resources in Southern Spain. *J Physiol Pharmacol*, 56 Suppl 1, 97-114.
- Ananthanarayan, L., Dubey, K. K., Muley, A. B., & Singhal, R. S. (2019). Indian traditional foods: Preparation, processing and nutrition. In *Traditional foods: history, preparation, processing and safety* (pp. 127-199). Cham: Springer International Publishing.