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An Ethnobotanical Study of Medicinal Plants Administered for the Treatment of Hyperlipidemia in Bushehr, South Iran

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ABSTRACT

Introduction: Hyperlipidemia is recognized as a crucial risk factor for cardiovascular diseases. Medicinal plants possess various biological properties for the treatment of diseases. Hence, the present study was carried out to collect ethnobotanical knowledge about medicinal plants used for the treatment of hyperlipidemia in Bushehr, South Iran.
Methods: This study was performed in Bushehr, South Iran. Ethnobotanical information was collected through interviews and questionnaires among 25 traditional healers. Demographic information was also received from traditional healers. Ultimately, the data were analyzed in Excel.
Results: Findings showed that eight medicinal plants from seven families were administrated for the management of hyperlipidemia. Our results also highlighted that the medicinal plants in the Asteraceae family (*Cichorium intybus* L. and *Silybum marianum* L. Gaerth.) exerted the most application in the management of hyperlipidemia. Furthermore, it has been concluded that aerial parts were the most usable part of the plant (50%). Seeds (25%), leaves (12.5%), and fruits (12.5%) were other usable parts of the medicinal plants. Moreover, it has been observed that decoction (56.25%) and fresh (43.75%) were the most important types of preparation methods for medicinal plants, respectively.
Conclusion: According to the results, the studied medicinal plants showed beneficial effects against hyperlipidemia. Therefore, further studies about the biological role of active ingredients present in these medicinal plants could increase the acceptance of the use of these herbs.

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Intorduction

Hyperlipidemia or the increase in blood lipids is a condition that has augmented in prevalence as an important disease, especially during the last decades with the growth of sedentary lifestyle, and it is actually one of the complications of industrial and semi-industrial life (Michaud et al., 2022). Although hyperlipidemia is not a disease alone, it is an important risk factor with important complications such as coronary artery disease (CAD). It should be noted that CAD is the most common cause of death in most parts of the world, especially in the United States of America, and more than half of patients suffering from heart problems have blood lipid disorders. The relationship between low density lipoprotein (LDL) and atherosclerosis and congestive heart failure (CHF) has been proven (Alloubani et al., 2021). Currently, different drug groups are used to reduce hyperlipidemia, including

HMG. CoA reductase inhibitors, which have very strong effects (Jiang et al., 2018). These drugs are metabolized in the liver, and despite relatively fewer side effects than similar drugs, they still cause digestive side effects such as indigestion, bloating, constipation, diarrhea, and abdominal cramps. They also cause neurological complications such as myopathy and muscle pains, which are very common (Auer et al., 2016). During the last few decades, in most countries, the use of alternative treatments, especially herbal therapy and food supplements, has increased to treat various diseases, including the increase in blood lipids (Bagherniya et al., 2018). One of the important problems faced by physicians as well as users of medicinal plants is the lack of sufficient information on drug safety and its effect on disease. Fortunately, in recent years, extensive research has been conducted on the effectiveness of medicinal plants used in traditional medicine, which proves their effectiveness or lack of effectiveness (Maver et al., 2015). In traditional medicine, several treatments are used to treat high blood lipids, in which the role of medicinal plants is significant. Recent research on medicinal plants used in traditional medicine indicates that their phytochemical compounds including dietary fibers, vitamins, flavonoids, sterols and other antioxidant compounds can inhibit LDL oxidation and remove free radicals in addition to reducing blood fat. Furthermore, they can be effective in improving this disease by affecting the immune system and improving the body's metabolic disorders (Tungmunnithum et al. 2018; Asadi-Samani et al., 2015).Hence, the aim of this article was to conduct an ethnobotanical study about medicinal plants used for the management of hyperlipidemia in Bushehr, South Iran.

Materials and Methods

Region of Study

The current study was carried out in Bushehr. Bushehr, capital of Bushehr Province, is a port citylocated on the Persian Gulf coast in southern Iran. Bushehr covers 28°58′N to 50°50′E geographical coordinates. Bushehr has a desert weather. Bushehr is located at 8 meters altitude (Figure 1).

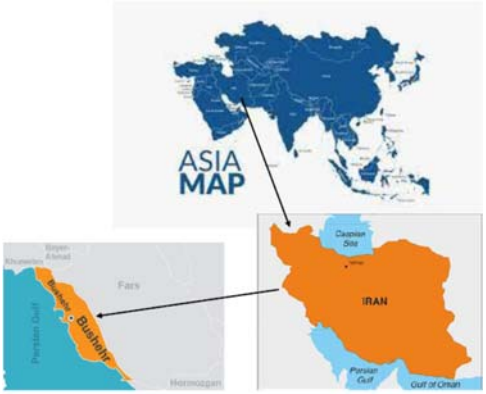

Figure 1. Location of study area, Bushehr, in Iran Map.

Data Collection

The present ethnobotanical study was conducted through a questionnaire in Bushehr city. This ethnobotanical investigation was performed from April 2022 to October 2022.This study was conducted through face-to-face visits and through interviews and questionnaires among 25 traditional healers. The questionnaire was distributed among traditional healers. The questionnaires contained demographic information. The questioners personally visited the studied subjects and registered the beliefs of herbal medicine in relation to receiving medicinal and ethnobotanical information. The results obtained from the questionnaires were directly transferred to the relevant tables and recorded. Finally, the data were analyzed by Excel. In this study, the number of times the plant was used was calculated through the following formula.

The number of times of use = the number of people who mentioned the effect of the plant ÷ the total number of people who filled out the questionnaires × 100 (Bahmani et al., 2014).

Results

The results of this study indicated that of 25 traditional healers studied, 7 were women and 18 were men. The education level of the traditional healers was from high school graduate to master's degree. As shown in Table-1, our results also identified that eight medicinal plants from seven families were used for treatment of hyperlipidemia. We also showed that the medicinal plants in Asteraceae family (*Cichorium intybus* L. and *Silybum marianum* L. Gaerth.) had the most application in management of hyperlipidemia. Furthermore, it has been concluded that aerial parts were the most usable part of plant (50%). Seeds (25%), leaves (12.5%) and fruits (12.5%) were other usable parts of the medicinal plants. Moreover, it has been observed that decoction (56.25%) and fresh (43.75%) were the most important types of preparation methods of the medicinal plants, respectively.

Table 1. Medicinal plants used for the management of hyperlipidemia

Scientific name	Family	Persian name	Usable part of plant	Preparation methods	Number	Percent
Anethum graveolens L.	Apiaceae	Shevid	Leaves	Fresh & Decoction	12	48
Phoenix dactylefera L.	Arecaceae	Nakhl	Fruits	Fresh	4	46
Cichorium intybus L.	Asteraceae	Kasni	Aerial parts	Decoction	11	44
Silybum marianum L.*Gaerth.*	Asteraceae	Kharmaryam	Seeds	Decoction	10	40
Sinapis arvensis L.	Brassicaceae	Khardal biabani	Aerial parts	Decoction	5	20
Capparis spinosa L.	Capparidaceae	Alafemar	Aerial parts	Decoction	8	32
Terminalia arjuna W.& A	Combretaceae	Arjoon	Aerial parts	Fresh	2	8
Plantago psyllium L.	Plantaginaceae	Espharzeh	Seeds	Fresh	7	28

Discussion

Ethnobotanical studies are good guides to identify the types of plants widely used in traditional medicine. Identifying potential plant resources to treat a wide range of diseases is one of the applications of this type of studies (Kareti et al., 2022). In the present investigation, the aim of the authors was to collect ethno-medicinal data from herbal traditional healer in Bushehr for the administration of medicinal herbs as a treatment for hyperlipidemia. The results of our study indicated that a total of eight species of medicinal plant belonging to seven families had application for the management of hyperlipidemia. Our results also identified that medicinal plants species such as *Anethum graveolens* L., *Phoenix dactylefera* L., *Cichorium intybus* L., *Silybum marianum* L. *Gaerth.*, *Sinapis arvensis* L., *Capparis spinosa* L., *Terminalia arjuna* W.& A and *Plantago psyllium* L. were the most important medicinal plants used for the treatment of hyperlipidemia. Hyperlipidemia is one of the most important risk factors for cardiovascular diseases. Common drugs to treat this condition also have many side effects. Therefore, providing solutions such as the use of medicinal plants can be reasonable (Boden et al., 2000). *Anethum graveolens* L. is a medicinal plant with edible and pharmacological features. *Anethum graveolens* L.has an important place in Iranian folk medicine for the treatment of hyperlipidemia. There are several investigations including clinical trials and animal studies about the positive role of *A. graveolens* L. in the treatment of hyperlipidemia. Researchers have exhibited that *A. graveolens* L. plays role in decreasing the serum levels of various types of lipids such as total cholesterol (TC), triglycerides (TG), Low-density lipoprotein cholesterol (LDL-C) and very low-density lipoprotein cholesterol (VLDL-C) and increasing serum level of High-density lipoprotein cholesterol (HDL-C)(12). It has also been highlighted that *A. graveolens* L. acts as an anti-hyperlipidemia agent via its influence on the enzymes involved in fat metabolism including HMG-CoA reductase or acyl CoA carboxylase. Furthermore, it has been observed that *A. graveolens* L. plays role in enhancing LDL receptors in the liver. There are several pieces of evidence about the presence of phytochemical constituents such as limonene, carvon, or α-phellandrene which are related to biological properties of *A. graveolens* L. including anti-hyperlipidemia effect (Mousavi et al., 2022). A growing body of evidence has revealed that various studies have demonstrated that medicinal plant species including *Phoenix dactylefera L.* (Khan et al., 2018), *Cichorium intybus* L. (Nishimura et al. 2015), *Silybum marianum* L. Gaerth. (Tajmohammadi et al. 2018), *Sinapis arvensis* L. (Men et al., 2022), *Capparis spinosa* L. (Mollica et al., 2017), *Terminalia arjuna* W.& A and *Plantago psyllium* L. (Hashem et al., 2021) could treat hyperlipidemia. It seems that the phytochemical constituents in these plants participate in decreasing serum lipids through various mechanisms. Various medicinal plants are used therapeutically to control hyperlipidemia in different parts of Iran. Iran, having different weather climates, has long been host to various types of plants, especially medicinal plants.Various medicinal plants have been recommended in different regions of Iran for the treatment of hyperlipidemia. For instance, nine species of medicinal plants including *Anethum graveolens* L., *Cichorium intybus* L., *Lactuca sativa* L., *Malva neglecta* Wallr., *Allium tripedale* Trautv., *Ocymum bacilicum* L., *Olea europea* L., *Urtica dioica* L., and *Vitis vinifera* L. from eight plant families were administrated traditionally for the treatment of hyperlipidemia in Lorestan Province, West of Iran. Similar ethnobotanical reports in different parts of Iran including in Mobarakeh of Isfahan showed that various species of medicinal plants such as *Rumex crispus* L., *Zingiber officinale* Roscoe, *A. graveolens* L., *Trigonella foenumgraecum* L., *Gundelia toutnefortil* L., *Menthespicata* L., and *Senna alexandrina* Mill possess anti-hyperlipidemia property. Several ethnobotanical studies in Kerman (East of Iran), Kazeroun in Fars Province (south of Iran), Sistan (southeast of Iran), Arasbaran (north-west of Iran) and IlamProvince (west of Iran)have demonstrated the role of various species of medicinal plants like *Sesamum indicum L.*, *Nigella sativa L.* and *Paliurus spina-christi Mill* in the treatment of hyperlipidemia (Delfan et al., 2014).

Conclusions

Our results showed that various species of medicinal plants in Bushehr alleviate hyperlipidemia through different underlying mechanisms. Indeed, a wide range of medicinal plant species with the numerous phytochemical constituents have unique biological properties, including

antioxidant effects that overcome oxidative stress as the main cause of various types of disorders and diseases including hyperlipidemia. Ethnobotanical studies provide a unique perspective on the use of medicinal plants in different regions of the world to treat diseases. However, more extensive studies are needed on the mechanism of action of these herbs, their safety, and their therapeutic effects.

Declarations

Conflict of interest

There is no conflict of interest among the authors.

Consent for publications

The authors approved the manuscript for publication.

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This study was carried out with personal funds from the authors.

Authors' contributions

ND conceived the research idea and MA designed the work. ND carried out the experiment, MH and ND wrote the first draft of the manuscript, ND and MA carried out the literature search, MA carried out the statistical analysis, and ND supervised the study. All authors read and approved the final manuscript for publication.

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the author.

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