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Research Article

Identification of Effective Medicinal Plants for Hyperlipidemia: An Ethnobotanical Study in Lorestan Province, West of Iran

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Abstract

In the recent decades, hyperlipidemia has considerably increased with the development of machine life. It has been accompanied by diseases such as hypothyroidism, liver and kidney diseases, diabetes, chronic kidney disease, as well as obesity and can cause complications such as atherosclerosis, hypertension, increased risk of stroke, and fatty liver disease. Lorestan province in the west of Iran has an ancient history in traditional medicine and abundance of medicinal plants. So, this study aimed to identify effective medicinal plants for hyperlipidemia in this province and report its effects on the treatment of hyperlipidemia and the related diseases. This study was conducted during 2008-2010 by 11 trained health volunteers with the cooperation of Food and Drug Chancellor, Razi Herbal Medicine Research Center, and Health and Treatment Networks of Khorramabad, Dorud, Poldokhtar, Boroujerd, Aleshtar, Aligoodarz, Kouhdasht, and Noorabad. Questionnaire method was used, and a specific questionnaire was designed to gather information on traditional herbal therapy, which has been used to reduce hyperlipidemia in this province. The results of the questionnaire analysis indicated that in lorestan province, nine species of medicinal plants from eight plant families were used for treating hyperlipidemia. Leaves were mostly used plant part (42%) and predominantly used herbal preparations were raw plants (46%). Summer with 38% of frequency was the most reported season for collecting medicinal plants effective for hyperlipidemia in this province. *Cichorium intybus* was the most frequently used medicinal plant (73.33%). Novel scientific studies support the ethnomedicinal use of some of the mentioned plants in the lorestan province of Iran for the treatment of hyperlipidemia. However, further clinical investigations are needed to confirm their efficacy and safety.

Keywords: Persian Medicine, Hyperlipidemia, Medicinal Plants, Ethnobotany, Lorestan, Iran

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1. INTRODUCTION

Hyperlipidemia is a predisposing factor for many diseases and has considerably increased in societies during recent decades as a result of the development of machine life. Hyperlipidemia is found along with diseases such as hypothyroidism, liver and kidney diseases, diabetes, chronic kidney disease, as well as obesity and can cause complications such as atherosclerosis, hypertension, increased risk of stroke, and fatty liver disease. Furthermore, hyperlipidemia may not be a symptom and patients may primarily suffer from it. Currently, the prevalence of hyperlipidemia and its related diseases has increased in developing as well as developed countries [1], [2]. For example, the prevalence of different types of hyperlipidemia in Iran has been found to be more than international standards [3].

In the most cases, drug therapy is needed to control and treat hyperlipidemia. However, problems related to conventional drugs including adverse events (digestive complications such as indigestion, bloating, constipation along with neurologic complications such as myopathy and neuralgia), growing rate of hyperlipidemia and its related complications despite the availability of these drugs dissatisfaction of patients with these drugs, emergence of complications induced by their prolonged use, as well as high drug costs [4], [5] have increased tendency to complementary and alternative treatments for the control and treatment of this disease. In this regard, traditional medical information of each region as well as identification and utilization of medicinal plants of that area may have an important role in identifying new medicines with plant origin for alternative treatments [6], [7].

Persian medicine is a traditional system of medicine was used historically in Iran from thousands years ago. It dates back to 10,000 years ago in prehistoric time [8]. Later, in ancient time - especially in Sassanid era (224-637 AD) - it was growth, and Joundishapour (in the southwest Persia) became the most important medical center and university in ancient world [9]. In Islamic golden age (early medieval time – 9-12th century AD), medicine was flourished by Persian scholars such as Akhawayni (?-983 AD), Rhazes (865-925 AD), Haly Abbas (949-982 AD), Avicenna (980-1032 AD), and Jorjani (1042-1137 AD) [10], [11]. Some of their manuscripts such as Canon of Avicenna were as the main medical textbooks in the west until 17th century AD. Ethnomedicine in Iran has such deep roots in the history [12]. Rich plant flora in Iran, vast knowledge of Iranians in using medicinal plants, existence of valid scientific centers, availability of written and non-written scientific resources on traditional applications of medicinal plants among Iranians are as the reasons that ethnopharmacological studies in Iran can be potentially interesting. Also, their interest in medicinal plants has necessitated paying attention to the science of herbal therapy.

The aim of the present study is an ethnopharmacological evaluation on the medicinal plants used for hyperlipidemia in lorestan, a province in the west of Iran with rich flora and ethnomedical traditions.

2. METHODS

The ethnobotanical study was performed to identify the effective medical plants for blood lipids in lorestan province. This province is located in the west of Iran, between 46°51' and 50°3' east longitude and 32°37' and 34°22' north longitude of the Equator. Geographic situation of this province is shown in figure 1.

In terms of weather conditions, the lorestan province has four semi-arid, moderate semi-humid, cold, semi-humid, and highland climates. The area of this province is about 28,300 ha^2. Also, its weather is varied in different parts of the province so that its climate variation is different from the north-east to south-west. From the north, it has common borders with Markazi and Hamadan, from the east, with Isfahan, from the south, with Khuzestan, and from the west, with Ilam and Kermanshah provinces.

The questionnaire method was applied to gather traditional information of medicinal plants which have been used to reduce blood lipid in this province. First, a specific questionnaire was designed. This study was conducted during 2008-2010 by 11 trained health volunteers and the cooperation of Food and Drug Chancellor, Razi herbal medicine research center and health and treatment networks of Khorramabad, Dorud, Poldokhtar, Boroujerd, Aleshtar, Aligoodarz, Kouhdasht, and Noorabad. The questionnaires contained information about the location, characteristics of interviewers, local names of the plants, local consumption case, used organs, consumption way, growing season, and types of plants kept at home. The trained volunteers attended the villages and the questionnaires were filled out by 70 villagers and traditional healers who were informed about the traditional medicinal plants of this area. The average age range of the studied people was 50-85 years old, and they included 21 women and 49 men. At the end, the frequency of use of each plant for hyperlipidemia (as the ratio – percentage - of frequency of citation of each plant by healers on the total number of healers) was calculated.

3. RESULTS

After data collecting, all the data from the questionnaires were entered into the Excel program and analyzed. Analysis of the questionnaires revealed that in lorestan province nine species of medicinal plants from eight plant families were used for the treatment of hyperlipidemia. Scientific names, family names, local names, Persian names, English common names, used organs, consumption manners, collection seasons, and traditional therapeutic effects of them are specified in table 1.

As shown in table 1, the results revealed that, among the plant organs, leaves were mostly used plant part (42%) and predominantly used herbal preparations were and raw plants (46%). Summer with 38% of frequency was the most reported season for collecting medicinal plants effective for hyperlipidemia in this province. *Cichorium intybus* is the most frequently used medicinal plant (73.33%). Other additional information is specified in figures 2-4.

4. DISCUSSION

Ethnobotanical studies have always been the source of novel ideas for traditional pharmacology. In this study, nine plant species which were used by people in lorestan province for reducing hyperlipidemia were specified. The most frequently used plant was chicory (*C. intybus*). The root of chicory has been used in lorestan province for the treatment of hyperlipidemia. Phytochemical from different categories including phenolic compounds [13], sesquiterpene lactones [14], and polysaccharides, and fructans mainly inulin have been distinguished in root [15]. Inulin and oligofructoses in chicory can improve the bowel function by improving digestion and increasing frequency of defecation and fecal bulk. In addition, inulin consumption reduces triglycerides (TGs) and fat production. Chicory extract significantly reduced cholesterol absorption in the small intestine, which is attributed to its inulin content [16]. *C. intybus* also reduced the liver TG accumulation by diminishing diacylglycerol acyltransferases (a hepatic enzyme contributing in the synthesis of TG from fatty acids) and microsomal TG transfer protein (a protein essential for hepatic lipoprotein assembly and secretion) activity [17].

There are scientific evidences about the efficacy of other medicinal plants introduced in this study for the treatment of hyperlipidemia. Dill reduced total TG and total cholesterol in male rats with diet-induced hyperlipidemia. In a randomized controlled trial comparing *Anethum graveolens* with gemfibrozil, gemfibrozil decreased TG and increased high-density lipoprotein-cholesterol more than anethum; however, anethum decreased total cholesterol more than gemfibrozil. Patients treated with anethum did not report any side effects [18].

Table 1. The list of medicinal plants used for hyperlipidemia as ethno-remedies in lorestan province of Iran

Number	Scientific name	Family	Local name	Persian name	English name	Used organ	Consumption	Collection season	Ethnopharmacological reported usage	Frequency of use
1	*Anethum graveolens* L.	Apiaceae	*Shevit*	*Shevid*	Dill	All organs	With cheese or mixed in food	Summer	Reduction of blood lipid	66.66%
2	*Cichorium intybus* L.	Asteraceae	*Chegh-cheghe*	*Kasni*	Chicory	Roots	Brewing up the root during night; the plant was supposed to be exposed to the moonlight	All seasons	Reduction of blood lipid	73.33%
3	*Lactuca sativa* L.	Asteraceae	*Kaour*	*Kahou*	Lettuce	Leaves	Consuming a raw lettuce leaf before the meal	All seasons	Reducing blood fat and belly fat	50%
4	*Malva neglecta* Wallr.	Malvaceae	*Tole*	*Panirak*	Common mallow	Leaves and stems	Dry with food and brewed	Spring to mid-summer	Blood purification from lipids	66.66%
5	*Allium tripedale* Trautv.	Amaryllidaceae	*Aneshk*	*Piaze tabestaneye-L-lorestani*	A species of wild onion	Aerial organs	Raw, with food, and brewed	Spring	Treatment of hyperlipidemia	61.66%
6	*Ocymum bacilicum* L.	Laminaceae	*Riho*	*Reyhan*	Basil	Leaves	Brewed	Summer	Reduction of blood lipid	58.33%
7	*Olea europea* L.	Oleaceae	*Zetoun*	*Zeytoun*	Olive	Leaves and seeds	Leaves with salad	All seasons	Control of blood lipid	61.66%
8	*Urtica dioica* L.	Urticaceae	*Gez-gezou*	*Gazneh*	nettle	Leavesand twigs	Sodden	Spring, summer, and fall	Reduction of blood lipid	50%
9	*Vitis vinifera* L.	Vitaceae	*Aniyr*	*Angour*	Grape	Fruit (unripe grapes)	Verjuice	Spring and summer	Reduction of blood lipid	45%

Figure 1. Geographical situation of lorestan province in Iran

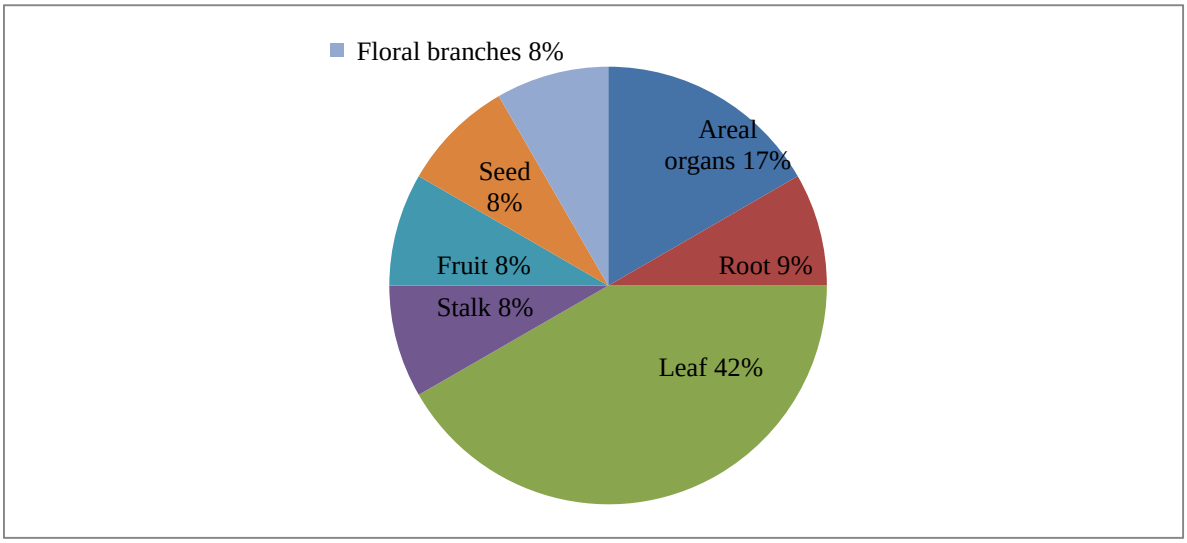

Figure 2. Frequency of the used organs of medicinal plants which were studied in this research

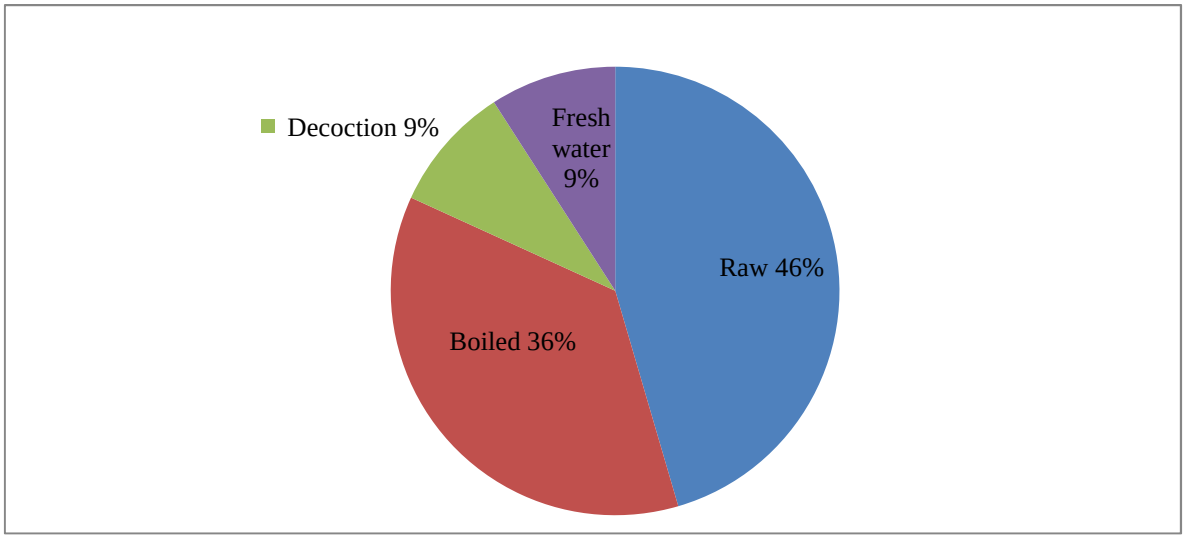

Figure 3. Frequency of traditional consumption percent for applying medicinal plants used for hyperlipidemia in lorestan province

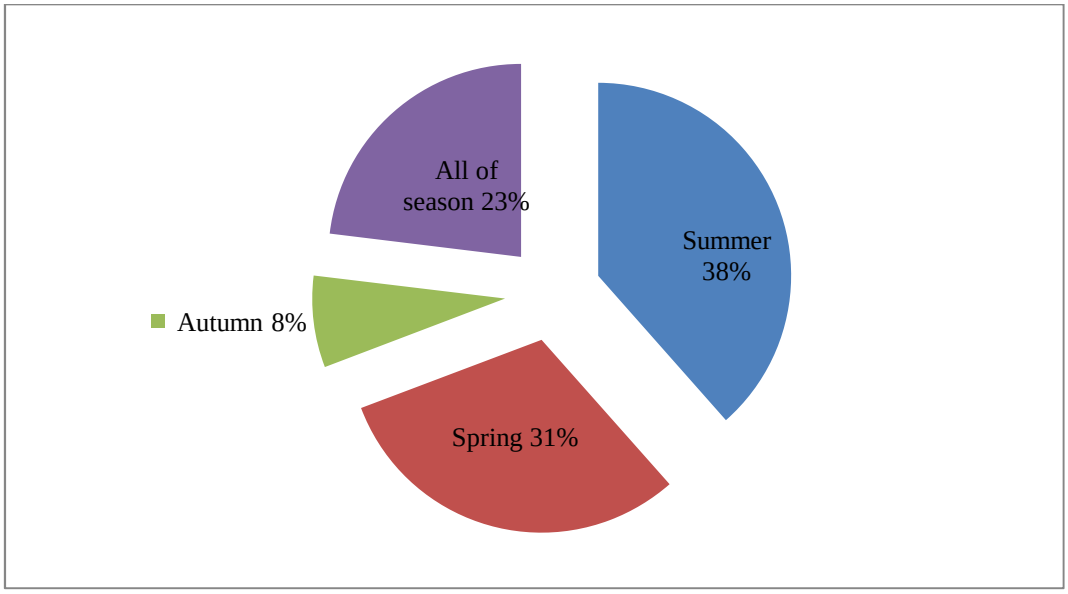

Figure 4. Frequency of collection season percentage of medicinal plants effective for hyperlipidemia in lorestan province

The aqueous extract of basil lowered levels of plasma cholesterol, TGs and low-density lipoprotein (LDL)-cholesterol in Triton WR-1339-induced hyperlipidemic rats. Its hypolipidemic activity was markedly stronger than that of fenofibrates. Its hypolipidemic effect has been attributed to its antioxidant activity [19]. Decoction from *Olea europea* leaves produced hypocholesterolemic effect accompanied by lowering of oxidized LDL in hypercholesterolemic insulin resistant sand rats [20]. Urtica dioica extract significantly reduced the levels of total cholesterol and LDL and also markedly decreased liver enzymes and weight in animals with a high cholesterol diet [21].

Ethnobotanical studies in other parts of Iran have also introduced medicinal plants for hyperlipidemia. For example, the ethnobotanical study in Mobarakeh of Isfahan showed *Gundelia toutnefortil* L., *Menthe spicata* L., *Rumex crispus* L., *A. graveolens* L., *Zingiber officinale* Roscoe, *Trigonella foenum-graecum* L., and *Senna alexandrina* Mill., are medicinal plants used for reducing blood lipid in the central area of Iran. In Kerman (east of Iran), some plants such as *Coriandrum sativum* L. and *Sesamum indicum* L. were used to reduce blood lipids. Also, plants such as *Teucrium polium* L. and *Solanum nigrum* L. were used for this complication in the city of Kazeroun in Fars Province (south of Iran). *Nigella sativa* L. in Sistan (south-east of Iran); *C. intybus* L. in Arasbaran (north-west of Iran) and *Paliurus spina-christi* Mill. In Ilam Province (west of Iran) are some other examples of ethnomedicines used in Iran for hyperlipidemia.

Overall, documenting the traditional knowledge of different regions may lead to obtaining useful remedies for controlling various diseases including hyperlipidemia. Novel scientific studies support the ethnomedicinal use of some of the mentioned plants in the lorestan province of Iran for the treatment of hyperlipidemia. However, further clinical investigations are needed to confirm their efficacy and safety.

6. Conflict of Interests

Authors have no conflict of interests.

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