

Full Length Research Paper

Traditional treatment of high blood pressure and diabetes in Souk Ahras District

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This study reports an ethnobotanical survey of the medicinal plants used for the treatment of diabetes and hypertension in six divisions of Souk Ahras District in Algeria. A total of 200 informants, including some healers, were interviewed throughout different divisions of the district. These ethnobotanical investigations allowed the development of an inventory of 59 medicinal plants belonging to 35 families; 28 of the plants are used for diabetes, 15 for hypertension, and 16 for both diseases. In this region, the most frequently used plants to treat diabetes include *Olea europea*, *Ajuga iva*, *Allium cepa*, *A. sativum*, *Myrtus communis* and *Trigonella foenum graecum*. The plants used to treat high blood pressure include *A. cepa*, *A. sativum*, *Artemisia herba-alba*, *Nigella sativa*, *Olea europea*, and *Rosmarinus officinalis*. Ethnomedical documentation and sustainable plant uses can support drug discovery efforts in developing countries.

Key words: Diabetes, hypertension, ethnobotanical, traditional medicines.

INTRODUCTION

Currently, the world population is confronted with the rapid emergence of several chronic diseases, including diabetes and high blood pressure, which present economic, as well as a serious current and long-term health problems (Tra Bi et al., 2008). Firstly, diabetes, mainly type 2, has become a truly global problem for humanity, since projections estimate as many as 380 million diabetics globally by 2025, representing a staggering 7.1% of the world population (International Diabetes Federation, 2006).

According to the investigation of the National Institute of Public Health (INSP), and according to the classification Global Burden of Disease (GBD), diabetes occupies the 4th place among the top ten causes of death (INSP, 2005). Secondly, according to the World Health Organization (WHO) (1985) more than 20% of the world's population is affected by high arterial blood pressure (Eddouks et al., 2009). In view of the expansion of these diseases, the resolution of WHOAFR/RC50/R3 in August 31, 2000 encouraged African countries to elaborate regional strategies on traditional medicine in order to begin research on medicinal plants and to improve their optimal uses in the healthcare systems (Eddouks et al., 2009). Finally, the United States Food

and Drug Administration (FDA) showed that natural products have a significant place in the discovery of new therapeutic agents (Cordell, 1995; Newman and Cragg, 2007). Ethnopharmacologic knowledge is a holistic system approach that can serve as an innovative and powerful discovery engine for newer, safer, and more accessible medicines (Cordell, 1995; Nanyingi et al., 2008; Patwardhan, 2005).

In Southern Algeria, several ethnobotanical surveys have been carried in the Central Sahara region (Maiza et al., 1990, 1992, 1993a, 1993b, 1995, 2006). However, in Northern Algeria ethnobotanical studies still remain unexplored, especially in the North-Eastern part of the country. The purpose of the present investigation was to establish an inventory of medicinal plants which grow and/or are available in the Souk Ahras province, and which are used traditionally to treat diabetes and high blood pressure.

MATERIALS AND METHODS

Study area

Geographically, Souk Ahras District is situated in the north Eastern part of Algeria, bordering on Tunisia, and covers approximately

4,541 km² (estimate of 2007). It is divided into 10 sectors and includes 26 villages. It is bordered by the Republic of Tunisia in the east, Guelma in northwest, Oum El Bouaghi in the southwest, Tebessa in the southeast and El Tarf, Annabain in the northeast. Souk Ahras district is also crossed by the principal wadi in North Africa, the Medjerda. It lies between latitudes north 36° 14' 00" N and longitudes east 8° 10' 00" E of the Prime Meridian. The geomorphological configuration of the Souk Ahras region reveals two important areas. The study area is characterized by a Mediterranean climate in the North and a continental climate in the far South of this region.

Ethnobotanical survey

Questionnaire

A questionnaire was developed and modeled according to various surveys (El-Hilaly et al., 2003; Tahraoui et al., 2007). The questions were focused on the names of the most commonly-used plants, the reasons for using the plants, the part of the plant used, the method of medicinal plant preparation, the route of administration, and the possible adverse effects of plants, and the accessibility of the population to health services.

Based on the information gathered, the plants mentioned as being used for the treatment of diabetes and high blood pressure were selected from the synoptic table. The questionnaire was addressed to two groups of people: those who knew the use of medicinal purposes, the local herbalist, and those who used medicinal plants, the patients.

Local herbalists

Eighteen local herbalists having a practical knowledge of the use plants in medicine were interviewed in six villages: M'daourouch, Sedrata, Drea, Machrouha, Taoura and Souk Ahras during the six-month period from January to June, 2010. Local herbalists were selected based on their knowledge of medicinal plants, either for self-medication or for treating patients.

Study population

A total of 200 patients from public health institutions were selected based on their socio-economic level, knowledge, attitude, and pathology (Höft et al., 1999) The study population included patients suffering from high blood pressure and diabetes of both sexes.

Data analyses

Informants were asked to be present at the local field collection sites, and indicate the medicinal plants being used with the local name. The species mentioned by the informants were then taxonomically identified. The botanical identification and the nomenclature of the listed plants with their different vernacular and scientific names were based on the morphological descriptions presented in the Flora of Algeria (Quezel and Santa, 1963).

RESULTS

Medicinal plants used by the local population

A total of 200 patients (112 women and 88 men) ranging in age from 10 to 90 years old, were included in the

study. Fifty-three (53) people were listed who requested plants for use in partnership with synthetic drugs against arterial hypertension and diabetes for a percentage of 26.5%. Of these 53 patients, 31 requested plants against diabetes (15.5%), while 22 requested plants against hypertension (11% of the population) (Figure 1). As noted, of these two pathologies, diabetes is that which is known better by traditional medicine in Souk Ahras Province.

However, in order to propose a treatment for any patient presenting one or the other of the diseases, all the herbalists who operate as tradi-therapists also require the diagnosis of a doctor. It is an effective collaboration between western and traditional medicine practitioners. In order to ascertain the medicinal species used by these patients, as delivered by the herbalists, interviews were conducted with the herbalists. This approach demonstrates that diabetic patients use medicinal plants in addition to pharmaceutical drugs. Furthermore, the local knowledge encompasses historical and present beliefs, traditions, practices, and views developed by the local human communities over time (Vandebroek et al., 2011).

Medicinal plant diversity and ethnobotanical knowledge

The results of the survey indicate that there are 59 medicinal plant species in use in Souk Ahras (Table 1). Most of these species grow naturally in the different local regions and their properties are important in traditional Arabic medicine. They are distributed in 35 plant families. The families most represented are Lamiaceae, Apiaceae, Liliaceae, Brassicaceae, Cupressaceae and Myrtaceae. Among the plants listed in Table 1, 44 species (74.6% of the total plants) are used for arterial hypertension and diabetes, 28 species (47%) are used for treating diabetes, and 15 species (25%) are used for treating high blood pressure. The most frequently used plants to treat diabetes include *Ajuga iva*, *Allium cepa*, *Myrtus communis*, *Olea europea*, and *Ptychotis verticillata*, and those to treat hypertension include *A. cepa*, *A. sativum*, *O. europea*, and *P. verticillata*. The plant part which is mostly used in medicinal preparations is the leaves. They are available throughout the year are of easy access and are a sustainable resource. They are followed by the stem bark, roots and the floral parts (Figure 2). The stem bark and root parts may or may not be sustainable, depending on the plant source. All of these plant parts are prepared mainly in the form of a decoction (47%). This is the mode of plant preparation most commonly used by the large majority of the herbalists. This is followed by 40% of infusions and 13% of macerations which are also prepared. These preparations are all prepared and used practically as a drink. According to the survey, the practitioners administer their remedies in the form of a standard decoction prepared by boiling the plant parts in hot water, an infusion in water or oil, or by

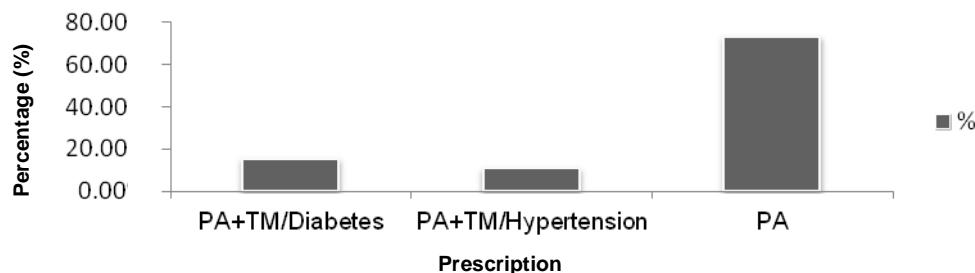


Figure 1. Distribution of the prescription according to mode of treatment. PA: Pharmaceutical agents, TM: traditional medicine.

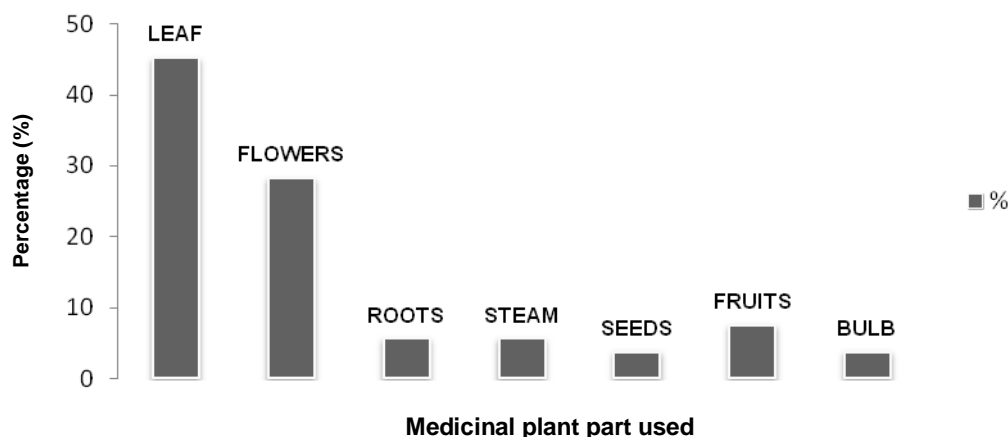


Figure 2. Distribution of the use of medicinal plants according to the plant part used.

macerating the plant parts in oil. The remedies were administered orally or externally according to the disease being treated and the method of preparation (Table 1).

DISCUSSION

The claimed therapeutic indications of some of these plants have been validated by studies in experimental animals. In patients with diabetes, for example *Artemisia herba-alba* (Al-Waili, 1986, 1988a), *Marrubium vulgare*, *O. europaea* var. *oleaster* (Circosta et al., 1986), *Trigonella foenum-graecum*, and for patients with hypertension *A. sativum*, *Art. herba-alba* (Al-waili et al., 1986; 1988; Eddouks et al., 2002; Jouad et al., 2001; Twaij et al., 1988) and *O. europaea* var. *oleaster* (Komaki et al., 2003; Gonzalez et al., 1992; Sedef et al., 2009). Some species, such as *Hordeum vulgare* and *Zygophyllum cornutum* are described for the first time for treating diabetes and *Borago officinalis*, *Centaurea benedicta* and *Arbutus unedo* are indicated for treating hypertension in this survey.

The Islamization of Algeria played a paramount role in the cultural development of plant as medicinal agents. Among the plants quoted as anti-hyperglycemic, some

are drawn directly from Qurrun and other religious manuscripts. This is the case in particular for *M. communis* L. and *Nigella sativa* L. (Eddouks et al., 2007). Among the cited plants, some are mentioned in other traditional pharmacopeias, especially those of the Mediterranean region. Cultural mixing supports the exchange of knowledge relating to the traditional systems of care (Eddouks et al., 2007). The food practices and the nutritional factors are regarded as the foundation in the treatment and the prevention of diabetes (Eddouks et al., 2007; Srivastava and Mehdi, 2005). However, some of the plants identified are toxic, although fortunately, most of the prescribers/users are aware of the toxic plants found in Souk Ahras province. The main toxic plants are *Citrullus colocynthis* (Abdel-Hassan et al., 2000; Al-Ghathai et al., 2004; Nmila et al., 2000), *Nerium oleander* (Eddouks et al., 2007), and *N. sativa* (Al-Hader et al., 1993; El Tahir et al., 1993; Murli et al., 2011; Labhal et al., 1999; Zaoui et al., 2000) which are still used in the treatment of diabetes and/or hypertension.

The importance of the conservation and preservation of medicinal plants, including the preservation of the ethnobotanical knowledge is being increasingly recognized. However, there are often significant problems with accessing and interpreting this knowledge (Huntington,

Table 1. List of medicinal plants used in traditional medicine in Souk Ahras Province (United States Department of Agriculture (USDA), 2010).

Family	Plant name	Local name	Part used	Therapeutic indications
Anacardiaceae	<i>Pistacia lentiscus</i> L.	Dhrou	LF	Expectorant: cough and bronchitis
			FR	Healing wounds and burns
			RS: Mastic	Irritations, stomach ulcers
Apiaceae	<i>Ammi visnaga</i> Lam.	Khlellal, Siouak en'bi	SE	Urethral lithiasis and nephretic colic Sedative Vasodilator
	<i>Ptychotis verticillata</i> Duby	Nûnkha	AP	Hypoglycemic Hypotensive
	<i>Coriandrum sativum</i> L.	Kosbar	LF	Carminative
			SE	Antispasmodic
	<i>Apium graveolens</i> L.	Krafs	RT, SE, LF	Antispasmodic Carminative Diuretic
	<i>Pimpinella anisum</i> L.	Habet h'lawa	SE, LF	Carminative Antispasmodic Stomachic
	<i>Petroselinum sativum</i> L.	Maâdanous	LF, RO, SE	Diuretic Hypotensive
Apocynaceae	<i>Nerium oleander</i> L.	Defla	LF	Cardiotonic
Capparidaceae	<i>Capparis spinosa</i> L.	Kebbar	FR,SE	Hypoglycemic, diuretic
			LF	Diuretic
Boraginaceae	<i>Borrago officinalis</i> L.	Boukhrich	FL	Sudorific
				Hypotensive
Brassicaceae	<i>Artemisia absinthium</i> L.	Chadjaret Merièm	LF	Hypoglycemic
	<i>Artemisia herba alba</i> Asso	Chih	LF, FL	Hypoglycemic
	<i>Centaurea benedicta</i> L.	Khirriya, chouk el-djamel	PL	Hypotensive

Table 1. Contd.

	<i>Cynara scolymus</i> L.	Quarnoun	LF	Hypoglycemic, Depurative
	<i>Lepidium sativum</i> L.	Habb errachad	SE	Hypoglycemic
Cucurbitaceae	<i>Citrullus colocynthis</i> (L.) Schrad.	Handal	FR	Hypoglycemic
Cupressaceae	<i>Juniperus phoenicea</i> L.	Aâr-âar	LF	Hypoglycemic
			LF	Diuretic
			FR	Antirhematic , Antiseptic
			LF	Hypoglycemic, Hypotensive
	<i>Tetraclinis articulata</i> Mast.		SE	Hypoglycemic
Ericaceae	<i>Arbutus unedo</i> L.	Lenj	LF	Hypoglycemic, Hypotensive
			RT	Antiinflammatory, antidiarrheal
Euphorbiaceae	<i>Ricinus communis</i> L.	Kharowâ	LF	Purgative
			SE	Laxative
Fumariaceae	<i>Fumaria officinalis</i> L.	Soltan el bouqoul	AP (wihout RT)	Hypotensive, diuretic
Globulariaceae	<i>Globularia alypum</i> L.	Tasselgha	LF, FL	Purgative, depurative Hypoglycemic
Poaceae	<i>Hordeum vulgare</i> L.	Chair	SE	Diuretic Hypoglycemic
Hypericaceae	<i>Hypericum perforatum</i> L.	Mesmoun	FL	Healing Tonic
Lauraceae	<i>Laurus nobilis</i> L.	Rand	LF	Antiseptic Hypoglycemic
Liliaceae	<i>Allium cepa</i> L.	Bsel	BL	Hypotensive
				Hypoglycemic
	<i>Allium sativum</i> L.	Tthoum	BL	Hypotensive
<i>Tanacetum parthenium</i>	Baboundj	FL, LF		Anti-inflammatory
Sch. Bip.				Antispasmodic

Table 1. Contd.

	<i>Ajuga iva</i> Schreb.	Chendgoura	FL, LF	hypoglycemic
	<i>Marrubium vulgare</i> L.	Marriouret	FL	Hypoglycemic
	<i>Mentha piperata</i> L.	Nânâ har	AP	Analgesic Carminative
	<i>Mentha viridis</i> L.	Nânâ	LF	Diuretic
	<i>Origanum majorana</i> L.	Mardqouch	FL	Stomachic
	<i>Origanum vulgare</i> L.	Zaatar	FL	Stomachic
Lamiaceae	<i>Rosmarinus officinalis</i> L.	Klil	FL, LF	Hypoglycemic Diuretic Stimulant
	<i>Salvia officinalis</i> L.	Souak en'nbi	LF, FL	Antisudorale Antispasmodic Hypoglycemic
	<i>Thymus vulgaris</i> L.	Zaitra	LF	Stomachic Antiseptic Antispasmodic
Loranthaceae	<i>Viscum album</i> L.	Loussiq	LF	Hypotensive
Malvaceae	<i>Malva sylvestris</i> L.	Khoubeiza	FL, LF	Laxative
Moraceae	<i>Morus nigra</i> L.	Toute	LF	Hypoglycemic
			SE	Laxative Diuretic
Myrtaceae	<i>Eucalyptus globulus</i> Labill.	Kalitus	LF, FL	Hypoglycemic , hypotensive
	<i>Myrtus communis</i> L.	Raihan	LF, FR	Hypoglycemic Anti-inflammatory
Oleaceae	<i>Olea europea</i> L.	Zaitoun	LF, FR	Hypoglycemic Hypotensive
Papaveraceae	<i>Papaver rhoeas</i> L.	Bbenaâman	FL	Soothing Sudorific, Emollient

Table 1. Contd.

Papilionaceae	<i>Trigonella foenum graecum</i> L.	Besbas	SE	Hypoglycemic
Polygonaceae	<i>Rumex patientia</i> L.	Houmeida	RT	Laxative
Ranunculaceae	<i>Nigella sativa</i> L.	Sanouj	SE	Hypoglycemic , Hypotensive
Rhamnaceae	<i>Zizyphus lotus</i> (L.) Lam.	Sadra	LE	Hypoglycemic, urinary infections
Rosaceae	<i>Rosa canina</i> L.	Nesrine	LF, FL	Calmanes (palpitations)
	<i>Crataegus oxyacanta</i> L.	Boumkherri	FR	Astringent, anti diarrhéique
			LF, FR, FL	Antispasmodic Hypotensive
Rutaceae	<i>Ruta graveolens</i> L.	Fidjel	AP	Emmenagogue Antihelminthic
Tiliaceae	<i>Tilia cordata</i> L.	Zaizafoun	FL	Antispasmodic Sedative
Urticaceae	<i>Urtica dioica</i> L.	Horaigua	LF	Hypoglycemic
Valerianaceae	<i>Valeriana tuberosa</i> L.	Sounboul	RT	Hypotensive
Verbenaceae	<i>Verbena officinalis</i> L.	Louiza	AP	Antispasmodic Anti-inflammatory
Zingiberaceae	<i>Zingiber officinale</i> L.	Zanjabil	RH	Tonic Analgesic
Zygophyllaceae	<i>Zygophyllum cornutum</i> Coss.	Bougriba	AP	Hypoglycemic

AP: areal part, BL: bulb, FL: flowers, FR: fruit, LF: leaf, PL: whole plant, RH: Rhizome, RS: resin, RT: roots, SE: seeds

2011; Saslis-Lagoudakis and Clarke, 2012). Recently, Saslis-Lagoudakis and Clarke. (2012) reported that the closer interaction between local practitioners and ethnobiologists who can study the relationship between humans and the natural world will enable local knowledge to be better

applied in ecological and evolutionary biological research. The collaboration between local practitioners, ecologists, evolutionary biologists and ethnobiologists is one of the most effective ways to incorporate local knowledge into biodiversity-related research (Saslis-Lagoudakis

and Clarke, 2012).

Conclusion

To preserve the ethnobotanical knowledge, it is

important to document and restore the remains of ancient medical practices that still exist in Algeria. For instance, traditional medicine can usefully and cost-effectively be integrated into the treatment of type II diabetes and hypertension using an optimized strategy for the patient. Scientific collaboration between local practitioners, ecologists, evolutionary biologists and ethnobiologists should be encouraged in Algeria, to access local knowledge and incorporate it into biodiversity research. The preservation of the traditional knowledge is an essential requirement for prioritizing and conducting research on natural products and drug development as a way to provide and enhance local cost-effective local health care practices (Saslis-Lagoudakis and Clarke, 2012).

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