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Ethnopharmacological survey of plants used in the traditional treatment of hypertension and diabetes in south-eastern Morocco (Errachidia province)

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Abstract

This survey was undertaken in the Errachidia province in south-eastern Morocco in order to inventory the main medicinal plants used in folk medicine to treat arterial hypertension and diabetes mellitus. Four hundred individuals who knew about and/or had used the medicinal plants for the indicated diseases, including some herbal healers, were interviewed throughout different regions of the province. The inventory of medicinal plants is summarized in a synoptic table, which contains the scientific, vernacular and common name of the plant, its ecological distribution, the part of the plant and the preparation used and the therapeutic indication. Extensive investigations have brought to light 64 medicinal plants belonging to 33 families; of these, 45 are used for diabetes, 36 for hypertension, and 18 for both diseases. Of these plants, 34% grow in the wild, 44% are cultivated, and 22% are not indigenous to the area and are brought from other parts of Morocco or from outside the country. The survey shows that 78% of the patients regularly use these medicinal plants. In this region, the most frequently used plants to treat diabetes include *Ajuga iva*, *Allium cepa*, *Artemisia herba-alba*, *Carum carvi*, *Lepidium sativum*, *Nigella sativa*, *Olea europaea*, *Peganum harmala*, *Phoenix dactylifera*, *Rosmarinus officinalis*, and *Zygophyllum gaetulum*, and those to treat hypertension include *Ajuga iva*, *Allium cepa*, *Allium sativum*, *Artemisia herba-alba* Asso, *Carum carvi*, *Nigella sativa*, *Olea europea*, *Rosmarinus officinalis*, *Origanum majorana*, *Peganum harmala*, and *Phoenix dactylifera*. The local people recognize the toxic plants and are very careful in using such plants, which are *Citrullus colocynthis*, *Datura stramonium*, *Nerium oleander*, *Nigella sativa*, *Peganum harmala* and *Zygophyllum gaetulum*. Our survey shows that traditional medicine in the south-eastern Moroccan population has not only survived but has thrived in the transcultural environment and intermixture of many ethnic traditions and beliefs.

Keywords: Medicinal plants; Ethnopharmacological survey; Errachidia; Ethnobotany; Diabetes mellitus; Hypertension

1. Introduction

Morocco is fortunate to have such a varied climate that almost any medicinal plant can grow and be cultivated economically. The heterogeneous ecologic conditions have favored the proliferation of more than 42,000 species of plants, divided into 150 families and 940 genus (Jahandiez and Maire, 1931/1934; Maire, 1952/1980; Negre, 1961; Ozenda, 1977; Hmammouchi, 1999), spread out the entire country with an area of 715,000 km^2. Since ancient times, this diverse flora has constituted the main source of products used in folk medicine. The Moroccan pharmacopoeia dates back to 711 AD (92nd year of the Hegira), which marks the expansion of Moslem influence into Europe. The Moroccan pharmacopoeia was further developed and enriched by the knowledge brought in by various ethnic groups that migrated to Morocco from many areas, including the Arabs from the Middle-East, the Andalusians and Jews from Europe, and the Blacks from Sudan, Senegal and Niger (Bellakhdar, 1997).

Noteworthy, the Arabo-Moslem medicine was taught in the Moroccan Islamic universities, such as Quarawin and Zaytouna, until 1893, when the practice was stopped by the French colonialists (Bellakhdar, 1997). The common ethnopharmacological legacy of the various Moroccan ethnic groups (such as the Sahraouis, Soussis, Rifains and Arabs) is well preserved being passed on from generation to generation by oral tradition and through written records, and is still flourishing. In the last decades, some institutions of higher learning have shown great interest in the field of ethnopharmacology, and their efforts have

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borne fruit by bringing to light the main medicinal plants found in several regions of Morocco (Bellakhdar, 1978; Bellakhdar et al., 1982, 1991; Ziyyat et al., 1997; Hmammouchi, 1999; Eddouks et al., 2002; El-Hilaly et al., 2003). These studies are not complete, since many areas of Morocco, especially the southern part of the country, still remain unexplored. Therefore, the purpose of the present investigation was to establish an inventory of medicinal plants that grow and/or are available in the Errachidia province in southern Morocco and are used traditionally to treat diabetes and hypertension.

2. Materials and methods

2.1. Study area and its climate

In preparation for the field trips, a literature review was conducted to learn about the geographic and cultural data on the study area. Errachidia, one of the wide provinces of Morocco, covers 8.55% of the total area of the country. Geographically, Errachidia has three physiographic sections: it is criss-crossed from north to west by the mountain range of the high Atlas; an arid plateau which spreads towards Sahara in the south and extending to the Algerian border; and a rocky and infertile plateau in the eastern section. The climate is arid, with an average yearly precipitation of 120 mm. There are large fluctuations in the daily (day and night) and the yearly (summer and winter) temperatures. Winds from Sahara blow constantly all year around.

2.2. The population of Errachidia province and living conditions

According to the 1994 National Census, 522,117 inhabitants populated an area of 6000 km^2. Administratively, Errachidia province was created in 1956 and it has been divided into seven Circles, namely, Errachidia, Rich, Goulmima, Arfoud, Errissani, Assoul and Imilchil. The province is inhabited mainly by two ethnic groups, Arabs and Berbers (Amazigh people who also speak Tamazight, an Afro-Asiatic language). The former group lives mostly in Errachidia, Erfoud and Errissani, while the later lives in the other Circles. Both groups are Moslems and co-exist peacefully. Although intermarriage is quite common, the two ethnic groups maintain their own traditions and practices, such as agricultural methods, food preparation, body care, folklores, ritual beliefs, etc. The population of Errachidia is mainly rural (66%) and very few services are available to the people. Most of the houses in this region are made of local inexpensive materials and are comfortable for the local weather. One may see conglomerates of houses called "Kssours and Kasba", which characterize this region by their special architecture. Most of the houses (82%) have no sanitary services. Often-times, several rural families live in one house, where an elder woman acts as the head and manages the family with the help of her daughters and/or daughters-in-law. The major activity of men in Errachidia is agriculture and animal breeding, while the women take care of the house and children. The main business is handicrafts and tourism.

The province of Errachidia also includes Tafilalt region, which is known as one of the most important historical region of Morocco. Its history dates back to 8th century when it was the commercial and spiritual capital, and from where the Islamic culture was extended over the whole of Africa. At the end of the 16th century, it became the caravan route between Sub-Sahara Africa, Egypt and Europe.

2.3. Ethnobotanical survey

The ethnopharmacological survey, started in 2003 and completed at the end of October 2005, was performed in all seven Circles of Errachidia province following the administrative map (Fig. 1). A multidisciplinary team was assembled, and political and health authorities were contacted for permission and for guidance. A questionnaire was prepared modelled after our previous survey (El-Hilaly et al., 2003). This form was designed to obtain information in the following areas: (a) general data on the informant, (b) school attendance, (c) housing and living conditions, (d) accessibility to health services, (e) use of plants for medicinal purposes, (f) source of plant material, part of the plant used, the method of medicinal preparation, and route of administration. Information was gathered verbally from each subject after explaining the purpose of the research and recorded on a card by the interviewer after verbal consent.

If plants were mentioned for medicinal purposes, a botanical sample was collected. These specimens were pressed and preserved for later identification by Prof. M. Fennane, an expert botanist from the Scientific National Institute, Rabat, and a voucher specimen of each plant was deposited in the herbarium of the Institute. Scientific names were cited according to the North Africa flora (Maire, 1952/1980; Fennane et al., 1999).

The questionnaire basically addressed two groups of people: those who knew and used the plants for medicinal purposes and those who did not. Based on the information gathered, plants mentioned three or more times in the treatment of diabetes and hypertension were selected from the synoptic table, which contained a list of hundreds of medicinal plants used for various ailments.

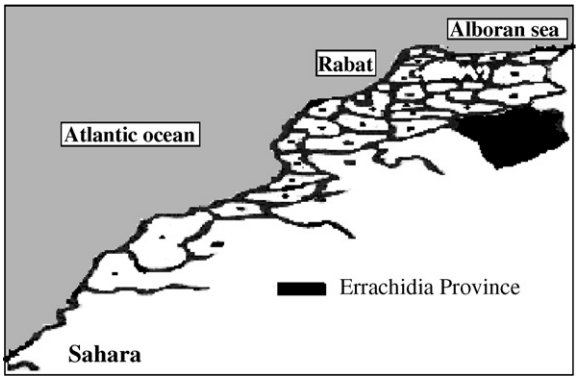

Fig. 1. Geographic location of Errachidia province in Morocco.