

Ethno-Botanical Survey for Medicinal Plants used by Pilgrims during Haj and Umrah for Treating Respiratory Diseases.

Saleem Nabila^{a,b}

^aBiology department, Taibah University, Saudi Arabia.

^bMinistry of Environment, EEAA and South Valley University, Egypt.y

Abstract

Traditional medicines have a long history of serving people all over the world. People in all cultures use plants to treat diseases. Plants have played a significant role and served humans well as valuable components in maintaining human health and improving the quality of human life for years. Millions of pilgrims from all over the world descend on the already crowded city of Makkah and Madinah during the pilgrimage. Too many people squeeze them into the city's holy mosque. They provide the perfect opportunity for the spread of diseases such as flu and cough. General practitioners are often recommended herbal medicines as a first-line treatment for respiratory illness. Pilgrims (depending on their culture and environment) use a wide range of medicinal plants such as fennel, anise, cinnamon, thyme and mentha as a mixture or individual to treat a variety of medical conditions, such as cold, asthma and coughs. They use these plants to eliminate a dry cough and make mucus more fluid and facilitate its removal. The study aimed to explore and document the plants used by pilgrims during pilgrimage seasons for the treatment of respiratory illness.

Introduction

For thousands of years plants have played a significant role and served humans as valuable components in maintaining human health and improving the quality of human life. People in all cultures use plants to treat diseases and maintain public health. According to WHO 80% of communities in the world depend on plants for their primary health care needs [1]. Plants still play a critical role in drug discovery and development; 28% of the new drugs approved in current use between 1981 and 2010 were of natural product origin [2]. Recent studies have also revealed promising results from using of plants as immune-stimulants which can not only be used against diseases but also as prevention for infection, this could be due to their antioxidant activity [3]. Hundreds of thousands of pilgrims from all over the world are descending on city of Makkah and Madinah during the pilgrimage (Hajj). Every year, more than 2.5 million Muslims from different parts of the world perform Hajj [4]. The Hajj congregations obviously become overcrowded and are a major public health challenges [5]. The recorded temperature during Hajj ranged between 37°C to 45°C [6]. Overcrowding and hot climate were major causes of health hazards among them. Pilgrims encounter a great deal of tough physical and mental stress and face multiple health issue such as diarrhea, heat stroke, and dehydration. Respiratory diseases were the leading health problems amongst them [7]. One in three pilgrims will experience such respiratory symptoms [8]. Close contact and overcrowding force hajj to squeeze themselves into the city's holy mosques to perform prayers; which provide a perfect opportunity for spread of infection, especially respiratory illness within elderly [9].

Cough, flu, fever and stomach pain are amongst the most common and widespread symptoms during that time. The symptoms of fever include headache, muscular aches and chest pains. Pilgrims (depending on their culture) use a wide range of medicinal plants as a first-line treatment for respiratory illness, such as fennel, anise, cinnamon, thyme and menthe. These plants are used as mixture or individually to treat a variety of medical conditions. They use these plants to eliminate dry cough and make mucus more fluid and facilitate its removal.

Aim of study

The study aims to document and explore the different plant species used by pilgrims during Hajj and Umrah seasons for treatment of respiratory illness.

Material and methods:

Data collection

Ethno-botanical surveys were conducted using semi-structured interviews and questionnaires. Data have been collected on the knowledge and practices of 120 participants (non-specialist informants) who were interviewed face to face coming from 12 different countries. For comparison reasons three key informants (herbalists and healers) from Madinah were interviewed to recall medicinal plants they use and describe the preparation of medical remedies. Pilgrims were asked to freely recall all medicinal plants and other natural remedies that they use or have used in the past. More specific information was recorded later by using structured interviews in which a specifically developed questionnaire was completed (Appendix I). The questionnaire was designed to obtain the following information; local plant names, plant parts used, preparation methods, dosage forms and quantities, use of plants in combination as well as related symptoms. They were asked to precisely describe the method of use and preparation of the medical remedies for each species. Voucher specimens from each species were collected and will deposit at the Herbarium (of the Taibah University) for identification.

Data analyses Ethnobotanical data were entered in to Excel spreadsheet and summarized using descriptive statistics.

Results:

1- Knowledge of the use of medicinal plants and their diversity

The main objectives of the present ethnobotanical study was to collect information on herbal remedies used traditionally by Pilgrims during Hajj and Omra, more than 120 pilgrims from 12 countries have been interviewed, the majority were females. During the interviews it was found that the Hajj knowledge about medicinal plants had been passed down orally to them by their mother or older family members such as their grandmother.

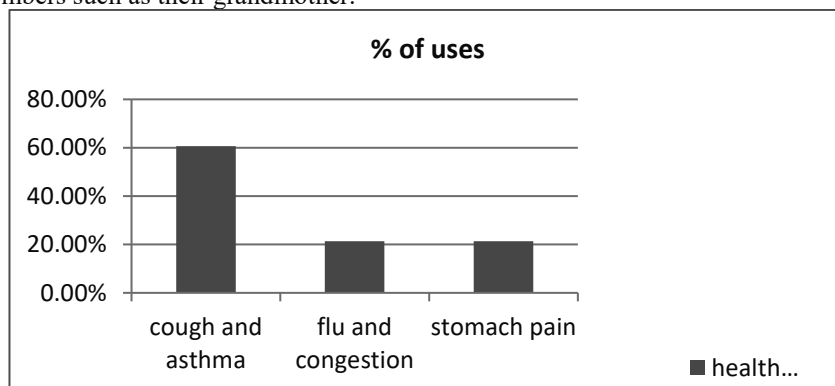


Figure 1 the percentage use of plants against various female reproductive conditions

Data collected revealed that 28 different plant species belonging to 21 plant families and 28 genera were commonly used by Hajj (Table 1) for medicinal purposes to treat conditions related to respiratory system such as: *Solenostemma argel* and *Pimpinella anisum*. The largest number of species was noted from the family Lamiaceae (seven species including, *Salvia malticaulis*, *Origanum Sinacum* and *Mentha longifolia*) followed by Apiaceae (four species). Cough treating was ranked the highest for the numbers of species used (60.7%) followed by flu and congestion (21.4%) then stomach pain (21.4%) (Figure1). The most frequently cited plants were essential oil plants. Preparation mainly involved as decoction for oral consumption or herbal steam bath, the preparation consists of a handful from each plant being added to boiling water in an open bucket, in which steam can reach the face and nose of the person.

2- Parts used, methods of preparation, means of administration

The plant parts used predominantly were the leaves and flowers and occasionally the whole plant. The administration was mostly oral as decoction or applied externally onto the chest and throat through steam bath or fume infusion. The most common way of preparing these plants was decoction (89%), followed by maceration (17%) and steam bath (10%) (Figure 2 & 5). The length of the treatment was highly variable from five days to two a month. The plants used in the treatments were usually used alone, but in a few cases they were used in combinations. The minimum dose when drinking the plants as a tea was at least three times a day over five days. The medicinal preparations were generally prepared just before use.

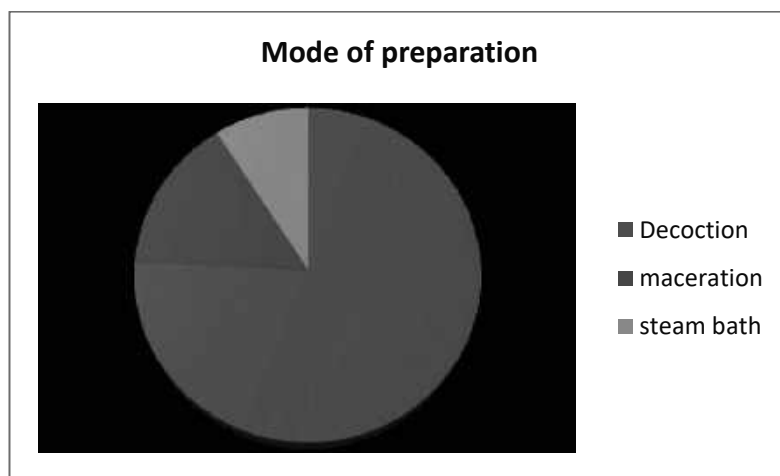


Figure 2 Method of administration of medicinal plants

3- Plants used and treatment for respiratory diseases

Zingiber officinale, *Citrus limon* and *Psidium guajava* were the most frequency mentioned for cough relief. For this purpose those plants taken individually and sometimes in combination, the plant mixture is boiled with water and the decoction is drunk three to five times a day. For example, in Palestine the combination are form zingier, guava and thyme with lemon and honey. While in Syria and Iraq this combination have another species such as camomile, rose and basil. While in Pakistan and India they call the herb combinations *Joshanda* which include seven different plant species included *Zizyphus jujuba* and basil.

Table 1 List of botanical and vernacular names of medicinal plants used by pilgrims, together with preparation, uses and cited frequency

Latin name	Family	Local name	Part (s) used	Ethno-medicinal uses	Methods of preparation and administration
<i>Mentha longifolia</i> (L.)	Lamiaceae	حبق	Leaves and flowers	Antispasmodic, cold and cough	Dried leaves soaked in water for decoction and is drunk as one glass 2-3 times daily until recovery
<i>Origanum syriacum</i> L.	Lamiaceae	زعتر	Leaves and flowers	Analgesic, cough stomach pain and as spices	Boiled with water and the decoction is drunk as one glass 2-3 times daily until recovery
<i>Salvia multicaulis</i> vahl	Lamiaceae	بردقوش	Leaves and flowers	Cough, cold throat infection and analgesic	Dried leaves boiled with water and the decoction is drunk as one glass 2-3 times daily until recovery
<i>Salvia officinalis</i> L.	Lamiaceae	ميرامية - common sage	Leaves and flowers	Cough, cold throat infection and analgesic	Dried leaves boiled with water and the decoction is drunk as one glass 2-3 times daily until recovery
<i>Rosa arabica</i> Crép.	Rosaceae	Rose-ورد برى	Flowers	For cold and flu	Dried leaves boiled with water and the decoction is drunk until recovery
<i>Solenostemma argel</i> Hayne	Asclepiadaceae	Argel – حرجل	Leaves and flowers	Cough, cold throat infection and analgesic	they wrapped in a blanket and face exposed to the fumes, or dried leaves boiled with water and the decoction drunk
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	زنجبيل - ginger	Rhizome	Cough, cold throat infection	Boiled with water, fume infusion
<i>Cinnamomum verum</i>	Lauraceae	قرفة - cinnamon	Bark	Antispasmodic, cold and cough	Boiled with water
<i>Phoenix dactylifera</i>	Palmae	رطب - date	Fruits	For cold and immunity	eaten
<i>Olea europaea</i> L.	Oleaceae	زيتون - olive	Oil from fruits	Oil for cough relief	External use, chest is massage with warm oil
<i>Acacia nilotica</i> L.	Mimosaceae	سنط	Seeds	Antispasmodic, cough and sore throat	Fume infusion or under tong for sucking
<i>Cymbopogon proximus</i> Stapf	Poaceae	حلف بر	Leaves and flowers	Vomiting, cough and congestion	Fume infusion or boiling with water
<i>Foeniculum vulgare</i>	Apiaceae	Fennel-الشمرد	The whole plant	Antispasmodic, cold and cough	Dried leaves boiled with water and the decoction is drunk until recovery
<i>Pimpinella anisum</i>	Apiaceae	Anise – بينسون	Seeds	Cough, cold throat infection and analgesic	Seeds boiled with water and the decoction is drunk until recovery
<i>Nigella sativa</i>	Ranunculaceae	black cumin - حبة البركة	Seeds	Cough, cold throat infection and analgesic	Seeds boiled with water and the decoction is drunk until recovery
<i>Mentha</i> sp.	Lamiaceae	Mint – النعناع	Leaves	Antispasmodic, cold and cough	boiled with water and the decoction is drunk

<i>Sesamum indicum</i> L.	Pedaliaceae	Sesame - سمس	Seeds oil	cold and cough	chest is massage with warm oil
<i>Psidium guajava</i> L.	Myrtaceae	Guava	Leaves	Cough, cold throat infection and flu	leaves boiled with water
<i>Chamomilla recutita</i>	Asteraceae	Chamomile - بابونج	Whole plant	Analgesic, cough stomach pain	leaves boiled with water
<i>Trigonella foenum-graecum</i> L.	Fabaceae	Fenugreek - حلبة	Seeds	Stomach and menstruation pain, cough and flu	seeds boiled with water
<i>Hibiscus sabdariffa</i> L.	Malvaceae	Roselle - كر كديه	Leaves	Blood pressure and cough	leaves boiled with water
<i>Coriandrum sativum</i> L.	Apiaceae	Coriander - كزبرة	Leaves, flowers & seeds	cough stomach pain, flu and cough	Leaves and seeds boiled with water
<i>Boswellia carterii</i> Birdw.	Burseraceae	ليان دكر	Resin	cough stomach pain, flu and cough	Resin is soaked in water
<i>Petroselinum crispum</i> (Mill.)	Apiaceae	Parsley - بقونس	Leaves	Urinary pain and cough	leaves boiled with water
<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Lemon- الليمون	Fruits	Cold, throat, flu and cough	Juice is drunk with hot water and lemon
<i>Illicium verum</i> .f.	Illiciaceae	Star anise- ينسون النجمة	Fruits and seeds	Flu	seeds boiled with water
<i>Lavandula angustifolia</i> Mill.	Lamiaceae	Lavender- خزامى	Flowers	Analgesic, cough stomach pain	leaves boiled with water



Figure 3 *Zingiber officinale*



Figure 4 *Cinnamomum verum*

Sudanese pilgrims used the herbal steam bath for nose congestion and flu, consisting of mixture of Acacia, Mentha and Zingier, the preparation consists of a handful from each plant being added to boiling water in an open bucket, in order to the steam can reach the nose. Then wrap in a blanket; it helps by drying up a running and dripping nose and expels phlegm from the respiratory tract. Also they burn the wood for Acacia and inhaled its fume. In India they boil water with black pepper, add cumin and jiggery to it. It will give relief from chest congestion.

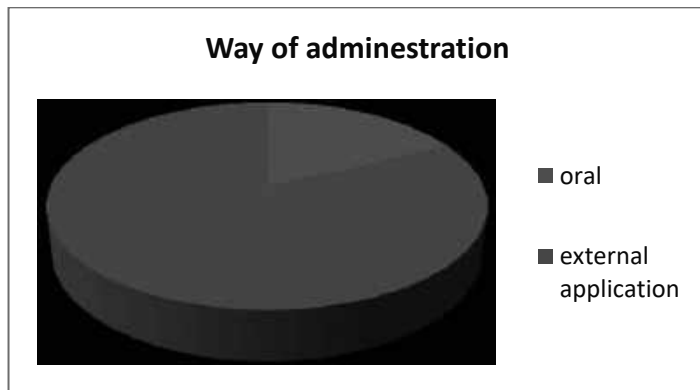


Figure 5 Mode of preparation

These plants are known to contain a high percentage of several flavonoids, sesquiterpene, volatile oils and alkaloids. Some studies revealed that the constituents of these plants attributing to their bronchodilator and cough-suppressant potential [10] as a reason for their ant-inflammation activities [11].

In the literature, the ethnomedicinal uses of these plants are well known, for example a tea made from the leaves of *M. longifolia* has traditionally been used in the treatment of fevers, headaches, digestive disorders [12]. The leaves are used as an antiseptic, in diarrhoea and gut spasm [13], while Zingier is used for treatment of coughs and stomach pains [12].



Figure 6 *Acacia nilotica*

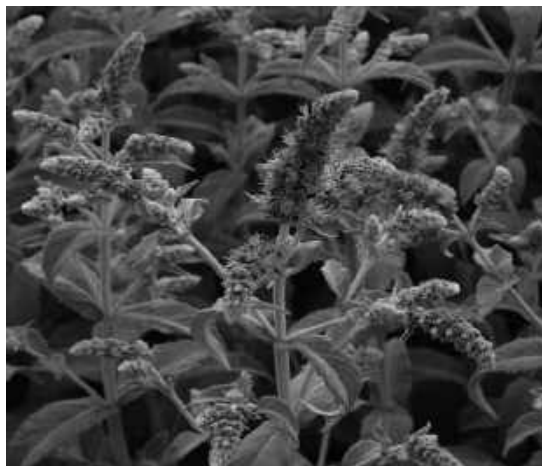


Figure 7 *Mentha longifolia*

Conclusions

This study provides data on the medical properties of locally available medicinal plants for treatment of respiratory diseases. An Ethnopharmacological survey was performed within Hajj in Haramain to identify the traditional uses of plants used for illnesses related to the respiratory diseases. Data collected showed that 28 plant species are used by pilgrims for treating their illnesses.

Documentations of traditional knowledge on the medicinal uses of plants have led to the development of numerous important drugs such as quinine, nicotine, cocaine and artemisinin [14] as well as taxol and tubocurarine [15]. Many plants species have been industrialized and others are under investigation for this purpose. For example, proximol, a sesquiterpenoid from *Cymbopogon proximus* possesses a unique antispasmodic property and is used for the propulsion of renal and a urethra calculus [16] as it produces relaxation of the smooth muscle fibres without abolishing the propulsive movement of the tissue [17].

Pharmacological and phytochemical evaluation of the therapeutic potential of some of these plants is important for providing scientific evidence for their usage and improvement of pilgrim's health and establishment the appropriate dosage levels, presence of toxicity and efficacy. These scientific investigations can provide guidance in setting up health care policies at the health care system for pilgrims in Saudi Arabia. As well as collaborative approaches involving traditional medical practitioners such as traditional healers and herbalist are critical to reduce the overcrowding in national hospitals. This could minimize the high cost involved with manufacturing medicine and financial resources which the kingdom pays for health program.

The implementation of a research programme to study the pharmacology and toxicology of the plants used in traditional herbal remedies during Hajj could meet the needs of society and improve the life quality of Pilgrims and contribution to the welfare of society.

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