An Ethnobotanical uses of Plants in the Middle Area, Gaza Strip, Palestine

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ABSTRACT

The present research work was designed to gather indigenous knowledge of plant species, which are being utilized by the local inhabitants of villages of the middle area of Gaza Strip, Palestine. This is the first study that these villages have been the subject of an ethnobotanical research. Information was gathered through interviews with the population in the study area. A total of 19 plant species belonging to 19 genera and 16 families have been recorded which are being used for treating 23 different diseases/ailments during 2008-2009. Herbs (10 species) were found to be the most used plants, followed by trees (5 species) and shrubs (4 species). The Compositae family contributed the highest number of plant species (3 species), followed by the Solanaceae family (2 species). Mimosaceae, Urticaceae, Cactaceae, Ephorbietae, Myrtaceae, Malvaceae, Tamaricaceae, Moraceae, Umbelliferae, Rhamnaceae, Caryophyllaceae, Thymelaceae, Plantaginaceae and Polygonaceae families contributed one plant species per family. Most of the species (6 spp., 32%) were used for treating skin diseases, followed by urinary system (4 spp., 21%), whereas other 4 species were used for treating digestive system, stomach relieved by 3 species (16%) and inflammation, tooth, kidney stones, nervous system, coughing, respiratory system are treated by 2 species. Among other notable ailments treated by only one plant species are prostate disorders, stop bleeding, back pain, liver diseases, flu, intestine pain, anemia, weight despicable, nervous system, diabetes, blood pressure, wounds and rheumatism. The interviewed informants reported the most widely used medicinal plant species were *Urtica* spp. treats 9 diseases (39% of total 23 diseases) followed by *Paronychia argenta* treats 4 diseases (17% of total 23 diseases).

Key words: Ethno-botany, Medicinal Plants, Gaza, Palestine.

Introduction

Traditional medical knowledge of medicinal plants and their use by indigenous cultures are not only useful for conservation of cultural traditions and biodiversity but also for community healthcare and drug development in the present and future [25]. Plants have been used in traditional medicine for several thousand years [1]. The knowledge of medicinal plants has been accumulated in the course of many centuries [23].

Ethnobotanical and ethnopharmacological research is crucial in the development of drugs from natural sources. Obtaining such information is important because traditional medicinal practices and medicinal plants have both traditionally and even in recent times been a good source of modern allopathic drug [10]. Some examples are the discovery of cardiotonics in foxglove, salicylic acid in willow bark, and morphine in poppies [26].

The information obtained on identification, preparation, clinical use, gathering, and preservation of medicinal plants dramatically facilitates the search for new drugs, and the time needed for drug development programs [18,30]. A recent review has shown that approximately 25% of modern medication have been plant derived, while 75% of new drugs against infectious diseases that have arrived between 1981 and 2002 originated from natural sources [6].

Historical surveys have indicated that the eastern region of the Mediterranean has always been a rich source of medicinal plants and that indigenous Arab medicine was a major contributor to the development of modern medicine in Europe [27].

There is a considerable lack of information on the number and type of medicinal plants used in Palestine particularly in Gaza Strip.

The study titled "A contribution to the flora of Gaza zone[9] is noteworthy to mention that the first account of the flora of Gaza Strip. This important study has reported 251 plant species belonging to 46 families. the most represented families were Leguminosae (41 species 16.3%), Compositae (35 species 13.9%), Gramineae (32 species 12.7%) and Caryophyllaceae (13 species 5.2%). Seventy-three of the recorded species in [22] study deals with the flora of the coastal sand dunes of Gaza Strip have at
least one aspect of the potential or actual economic uses, the medicinal (45%), grazing and human food (18% for each one) are the most common uses, while timber and ornamental use are less common.

[28] conducted an extensive ethnopharmacological survey among the most well known Arabic indigenous practitioners in Israel, the Golan heights and the West Bank in order to evaluate the potential of local plants used in treating different diseases and illnesses. The study revealed that 129 plant species are still in use in Arabic traditional medicine for treatments of various diseases. Furthermore, some 30% of the flora in Israel, the Golan Heights and the west Bank are considered rare, and many of these species are endangered [24,29]. The broad ethnobotany of different edible plants and folk medicine in West bank, Palestine were described by[1]. The work includes other uses by Palestinian in a host of manners, fresh, cooked and dried, both as foodstuffs and treatment of diseases and medicinal disorders.

The ethnobotanical survey was carried out in the year 1998 and reports information on 31 reliable local Arab practitioners living in Galilee, Negev, Golan Heights and West Bank was 60 years and the average years of practice were 20. The study showed that in many cases, the plant species used by the traditional practitioners are different from those used by the academic group, the average knowledge in identification of plants was good. On average, each practitioners used 22 different herbs for treating his patients. Eighteen practitioners collected their plants only from the wild (mostly from mountains or the desert), eight from the wild and Attarah shops, four from Attarah shops only and one healer imported his herbs. The current study revealed that 129 plant species are still in use in the Arabic traditional medicine for the treatment of various diseases. The main treated diseases were diabetes, liver, digestive, respiratory, skin, urinary and nervous [5].

Towards getting an initial picture of medicinal plan usage by the local inhabitants, the objectives of the present study was to conduct a systematic ethnobotanical survey of the middle area, Gaza Strip, Palestine to obtain information on the plant species and ailments for which they are used.

Material and Methods

The indigenous knowledge of local traditional people and native plants used for various purposes, particularly medicinal purposes were collected during field trips at different villages, refugee camps and different localities of middle are of Gaza Strip, Palestine such as Bureij, Nuseirat, Alzahra, Juhrelddeek, Oomalhajjar, Alqshash, Talalajoul and Talasanan during 2008-2009. Ethnobotanical information was obtained through oral interviews and designed semi-structured questionnaire from one hundred local interviewed informants. They were selected based on their knowledge of medicinal plants either for self-medication or for treating others. Sometimes, interviewed informants were asked to come to field and show the plants with local names; the species mentioned by the informants were taxonomically identified. Detailed information was collected as to plants with their local names, plant parts or combination of plants used, formulation of medicines, dosages, or if any single plant was used to treat multiple ailments, ailments for which the plants are used, as well as to any specific plant part used for the ailments concerned.

Standard method was followed with regard to survey and collection of plant materials from the study area, drying, mounting preparation and preservation of plant specimens. Voucher specimens of all plants, of the study area, in triplicates were collected, prepared and identified.

Taxonomic determinations and nomenclature were performed at Biology Department, Faculty of Science, Al-Aqsa University, with the help of floristic literature [31,33,13-16,8,9,12]. All the preserved specimens were deposited at the Biology Department where no Herbarium unfortunately established until now.

Results and Discussion

The indigenous knowledge of local traditional people and native plants used for medicinal purposes were collected through questionnaire and personal interviews during field trips. The flora of the study area provides diverse useful plant species.

The investigation revealed that, the interviewed informants used 19 species of ethnomedicinal plants distributed in 19 genera belonging to 16 families. Herbs (10 species) were found to be the most used plants, followed by trees (5 species) and shrubs (4 species). The most important families in the questionnaire information were Compositae (3 species), Solanaceae (2 species). Other families listed below with only one species: Mimosaceae, Urticaceae, Cactaceae, Ephorbiaceae, Myrtaceae, Malvaceae, Tamaricaceae, Moraceae, Umbelliferae, Rhamnaceae, Caryophyllaceae, Thymelaceae, Plantaginaceae and Polygonaceae.

A total of 19 plant species mentioned from the interviewed informants used for medicine purposes (Table 1).

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Botanical Name</th>
<th>Family Name</th>
<th>Local Name</th>
<th>Ailments Treated</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Matricaria aurea (Loefl) Sch.Bip</td>
<td>Compositae</td>
<td>Papounaj dahapi</td>
<td>used for treating coughing and chest diseases</td>
<td>37</td>
</tr>
</tbody>
</table>

Many plant species treat the same disease. The medicinal plant species used for most popular diseases and the percentage from the total 19 medicinal plants were reported by interviewed informants, in parenthesis, as follows: Skin diseases relieved by 6 species (32%), urinary system relieved 4 species (21%), digestive system relieved by 4 species (21%), stomach relieved by 3 species (16%) and inflammation, tooth, kidney stones, nervous system, coughing, respiratory system are treated by 2 species.

The interviewed informants reported the most widely used medicinal plant species were *Urtica* sp. treats 9 diseases (39% of total 23 diseases) followed by *Paronychia argenta* treats 4 diseases (17% of total 23 diseases).

According to the plant parts used recorded in the current questionnaire, leaves and fruits were the plant parts most widely used as edible parts. The interviewed informants mentioned the specific

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Family</th>
<th>Uses</th>
<th>Diseases/Tissues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Solanum nigrum</em> L.</td>
<td>Solanaceae</td>
<td>used for treating wounds</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td><em>Ricinus communis</em> L.</td>
<td>Euphorbiaceae</td>
<td>used for treating laxative</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td><em>Urtica sp.</em></td>
<td>Urticaceae</td>
<td>Kouries</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td><em>Paronychia argenta</em> Lam.</td>
<td>Caryophyllaceae</td>
<td>used for treating urinary system</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td><em>Polygonum equisetiforme</em> Sm.</td>
<td>Polygonaceae</td>
<td>Alikoudap</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td><em>Plantago coronopus</em> L.</td>
<td>Plantaginaceae</td>
<td>Wedna</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td><em>Foeniculum vulgare</em> Mill.</td>
<td>Umbelliferae</td>
<td>Shoumarpari</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td><em>Artemisia monosperma</em> Delile</td>
<td>Compositae</td>
<td>used for treating digestive system</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td><em>Ziziphus spina-christi</em> L.</td>
<td>Rhamnaceae</td>
<td>used for treating skin diseases</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td><em>Prosopis farcta</em> (Banks&amp;Sol.)</td>
<td>Mimosaceae</td>
<td>Gianpout</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td><em>Malva parviflora</em> L.</td>
<td>Malvaceae</td>
<td>Koupzea</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td><em>Opuntia ficus indica</em> (L.) Mill.</td>
<td>Cactaceae</td>
<td>Alteenalshwi</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td><em>Eucalyptus camaldulensis</em> Dehn.</td>
<td>Myrtaceae</td>
<td>Kafour</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td><em>Ficus carica</em> L.</td>
<td>Moraceae</td>
<td>Alteen</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td><em>Cichorium endivia</em> L.</td>
<td>Compositae</td>
<td>Series-Alleeck</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td><em>Lycium schweinfurthii</em> Dammer.</td>
<td>Solanaceae</td>
<td>Ousaj</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td><em>Tamarix nilotica</em> (Ehrenb.)</td>
<td>Tamaricaceae</td>
<td>Ethel-Terfa</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td><em>Thymelaea hirsuta</em> (L.) Endl.</td>
<td>Thymelaeaceae</td>
<td>Metnan</td>
<td>1</td>
</tr>
</tbody>
</table>
plant part which used for food purposes. We recorded the most important species, the plant parts used and the percentage of informants, in parenthesis, mentioned these species and parts as follows: *Ficus sycomorus* (41%), *Ziziphus spinas-christi* (17%), *Opuntia ficus indica* (8%), *Vicia sativa* (1%), *Lathyrus gorgonei* (1%) are eaten as fruits. *Malva parviflora* (31%), *Oxalis pes-caprae* (24%), *Portulaca oleracea* (19%) and *Cichorium endivia* (6%) are eaten as leaves. Finally, only 10% of the interviewed informants mentioned the stems of the species *Asparagus horridus* are eaten.

According to the traditional medicinal natural plants, the interviewed informants reported some plant species used as edible wild plants and others for medicinal purposes. These plant species were not occur in our study area but recorded in other locations of Palestine. The plant species and the percentage of interviewed informants, in parenthesis, were reported as follows: *Artemisia inculta* (19%) used for treating intestine; *Majorana syriaca* (12%) used for treating chest diseases and intestine; *Ammi visnaga* (11%) used for treating kidney stones, digestive system, respiratory system and urinary system; *Citrulus colocynthis* (10%) used for treating diarrhea; *Teucrium capitatum* (10%) used for treating intestine; *Salvia fruticosa* (8%) used for treating intestine; *Mentha spicata* (4%) used for treating intestine; *Cyperus rotundus* (1.4%) used for treating fold growth hair; *Ceratonia siliqua* (2%) used for treating constipation; *Anchusa strigosa* with value (12%), *Anethum graveolens* (6%), *Allium ampeloprasum* (3%), *Coriandrum sativum* (1%) are plant species mentioned as wild edible plants.

On the other hand the interviewed informants, in the following parenthesis, reported some wild plants with their possible uses as follows: For industry, fuel and windbreaks: *Eucalyptus camaldulensis* (57%), *Tamarix nilotica* (55%), *Ficus sycomorus* (41%), *Acacia saligna* (19%), *Ziziphus spinas-christi* (17%). For bordering agriculture fields: *Arundo donax* (24%), *Prospis farcta* (14%), *Opuntia ficus indica* (8%), *Lycium schweinfurthii* (2%), *Nerium oleander* (2%). For making baskets, small building inside farms, musical instruments: *Arundo donax* (17%), *Phargmites australis* (4%).

The interviewed informants reported 3 species used for external applications (mostly for skin diseases, snake bites and wounds), 12 species for internal consumption of the preparations were involved in the treatment of diseases and 4 species were involved in both internal and external uses. Different parts of medicinal plants were used as medicine by the local traditional healers. Among the different plant parts, the leaves were most frequently used for the treatment of diseases followed by the whole plant parts, fruit, stem, root, stem and root bark, seed, flower and latex.

The interviewed informants mentioned only 19 species medicinal plant species, whereas 17 of them were reported in literature survey study. The results revealed that 9 species are used for the same medicinal purposes in both literature survey study and questionaire study, while there are 8 species used in different way by the interviewed informants. In addition, 2 species were mentioned by the interviewed informants while not included in the survey literature study.

Comparing the data obtained from interviewed informants with other studies, we summarize the variation of medicinal plant use as follows: The 9 medicinal plant species use at same way: *Tamarix nilotica* used for treating tooth inflammation [2] *Matricaria aurea* used for treating coughing [28] *Solanum nigrum* used for treating wounds [28] *Eucalyptus camaldulensis* used for treating laxative [1] *Ricinus communis* used for treating laxative [28,23]. *Ficus carica* used for treating skin diseases and laxative [2] *Paronychia argenta* used for treating urinary system [28] *Polygonum equisetiforme* used for treating urinary tract diseases [28] *Malva parviflora* used for treating skin diseases [1].

The 8 medicinal plant species use at different way from interviewed informants compared with the literature studies: *Urtica sp.*., interviewed informants could not distinguish between different species, used for treating rheumatism, nervous system, diabetes, chest diseases, involuntary urination, high blood pressure, stones in kidney, skin diseases and weight Despicable. Literature study reported *Urtica pilulifera* L., used for treating cancer, stomach, intestine pain, inflammation, liver diseases and circulatory system [28] and leaves, herbal tea, stem, eaten raw as salad [2]. *Urtica urens* L., used for treating cancer, stomach, intestine pain, inflammation, liver diseases [28]. *Plantago coronopus* used for treating tooth diseases, urinary tract diseases, stop bleeding and involuntary urination by interviewed informants, while the literature study reported *Plantago coronopus* L. used for treating stomachache [32]. *Foeniculum vulgare* used for treating flu, skin diseases and digestive system inflammation by interviewed informants, while the literature study reported *Foeniculum vulgare* Mill used for treating a phrodisiac, diuretic, emmenagogue, galactogoue, stimulat, green leaves used to increase production of breast milk; sexual desire; and to treat kidney infection [1]. The interviewed informants mentioned that *Ziziphus spinas-christi* used for treating skin diseases, while the literature study reported *Ziziphus spinas-christi* (L.) Desf., used for treating cholesterol reduction, cancer, eye inflammation and hair loss [28]. *Prospis farcta* used for treating skin diseases by
interviewed informants while our literature study reported Prosopis farcta (Banks&Sol.) J.F Macbr., used for treating prostate disorders and interrupting the urine [2]. Opuntia ficus indica used for coughing mentioned by interviewed informants, while the literature study reported Opuntia ficus-indica (L.) Mill, used for treating skin diseases [4].

The interviewed informants mentioned that Cichorium endivia used for treating stomach inflammation and liver diseases, while the literature study reported Cichorium endivia L., whole plant poisoning and leaves are used for bacterial infection and rheumatism [28]. Thymelaea hirsuta used for treating nervous system reported by interviewed informants, while the literature study reported Thymelaea hirsuta (L.) Endl., used for treating skin diseases [28]. Finally, the last two species mentioned by interviewed informants and not included in the literature study are Lycium schweinfurthii used for treating stomach ulcer and Artemisia monosperma used for treating nervous system diseases. Silybum marianum, is medicinal plant species which occupies many locations of our study area, widely used throughout the Meddile East and with another species such as Ricinus communis and Artemisia herba alba are well known as the basis of European herbal medicine [5].

No clear dividing line between food and medicinal plants usually exists, especially in indigenous and local traditions. Food can be used as medicine and vice versa. Still certain wild edible plants are used because of their assumed health benefits and thus can be called medicinal foods [17]. Of the Earth's half million species, only about 3000 species have been us as agricultural crops and only 150 species have been cultivated on a large scale [19,20].

The survey of relevant literature showed that a total of 30 species (14 %) are wild edible plants. Whereas [2] recorded 100 wild edible plant species, traditional of wild edible plants used in Palestine (Northern West Bank). The interviewed informants mentioned some wild plants consumed cooked, for example, Malva sylvestris, Cichorium endivia, Oxalis pes-capare, Portulaca oleracea and Asparagus horridus. Some plants are consumed fried in olive oil (e.g., Rumex acetosa, Malva sylvestris, Cichorium pumilum) [2] Olea europea plant species have wide consumption mainly olive oil and many food. This is in agreement with similar findings of [7]: olive oil is the predominant oil (79%) used in Arab culture and one study suggested that olives have some protective effect against cancer. The literature study and interviewed informants revealed that some wild plants such as Eruca sativa, Foeniculum vulgare, Portulaca oleracea and Ziziphus spina-christi are consumed raw. The majority of these plants are eaten fresh, directly after they are gathered. [2] revealed that these species are used in salads and dressed with olive oil and lemon or are eaten with pickled olives, onions and bread. On the other hand, many edible fruits are consumed as desserts like Ziziphus spina-christi [2]. This is in agreement with what people think about Mediterranean diets and that Mediterranean people always portrayed eating vegetables raw [21]. These are food plants that receive recognition as medicinal in the Traditional Arabic Palestinian Herbal Medicine and represent of the Palestinian medicinal ethnoflora [2].

It is evident from the data of interviewed informants study, conducted in the study area of middle of Gaza Strip, knowledge of medicinal plants is very restricted to the local residents, reveal only 19 medicinal plants treat 23 diseases and ailments. Common diseases such as: Skin diseases, digestive system diseases, urinary system diseases, stomach diseases, coughing tooth inflammation, nervous system diseases and stones in kidney are considered to be diseases with natural causes and hence their symptoms are treated at the house-hold level. On the basis of the primary uses, Uthica sp., Paronychia argenta, Foeniculum vulgare, Eucalyptus camaldulensis and Matricaria aurea are considered the most important medicinal plants used by local residents at the area for treating the previously mentioned diseases. In addition study also points out that certain species of medicinal plants are being exploited by the local residents who are unaware of the importance of medicinal plants in the ecosystems.

In the present investigation, a comparison of the medicinal plants found in both survey literature study and the traditional knowledge of interviewed informants, we conclude that there are additional unpopular 34 remedies could be utilized by the local residents, the unpopular medicinal plants are: Silybum marianum, Atriplex halima, Cupressus sempervirens, Eruca sativa, Ficus sycomorus, Glauicium corniculatum, Marrubium vulgare, Nerium oleander, Olea europea, Portulaca oleracea, Sarcopoterium spinosum, Amaranthus spinosus, Amaranthus viridis, Ephorbia peplus, Ephorbia terracina Rumex pictus, Datura inoxia, Chrysanthemum coronarium, Lycopersicon esculentum, Capsella bursa-pastoris, Beta vulgar, Cynodon dactylon, Phoenix dactylifera, Asparagus horridus, Althagi graecorum, Scolymus hispanicus, Chrozophora tinctoria, Cyperus rotund, Lantana camara, Mercurialis annua and Tribulus terrestris.

The above data indicate more than 39 additional diseases and ailments could be treated by medicinal plants of the flora of middle area of Gaza Strip, as potential resource for treating various diseases such as: Bacterial infection,
poisoning infertility, sexual weakness, heart diseases, hair loss, eye inflammation, inflammation, bronchitis, asthma, fever, poisonous, diuretic, circulatory system, cancer, intestine pain, cholesterol reduction, emmenagogue, galactogoue, aphrodisiac, stimulant, night blindness, astringent, tumors, vaginal diseases, antipyretic, gonorrhoea, alexiteric, emollient, irritant, aedetative, muscular system, organ Britain system, blood, psoriatic, burns, mouth ulcers, gall bladder stones, paralysis, ulcer goiter and secretes more milk in women.

The present day traditional healers are very old. Due to lack of interest among the younger generation as well as their tendency to live in cities, there is a possibility of losing this wealth of knowledge in the near future. It thus becomes necessary to acquire and preserve this traditional system of medicine by proper documentation and identification of specimens.

Our surveys reveal a very limited exchange of information take place among practitioners, and between practitioners and researchers in our study area. The occupation of traditional healer is a family matter and passed on by inheritance; therefore, when the present generation of healers dies, the know-how may die with it because children of the practitioners have no interest on the subject. The habit of using wild medicinal and edible plants is still alive in Palestine, but is disappearing. Therefore, the recording, preserving and infusing of this knowledge to future generation is pressing and fundamental.

In particular, our study has demonstrated that there is an urgent need for the documentation of traditional knowledge to the intangible cultural heritage concerning traditional plant uses, and that such a heritage is much more complex that we may think.

The present study showed that traditional knowledge of uses of plant species of middle area of Gaza Strip for the cure of many diseases and ailments is still available among the tribal and local residents and medicinal healers, but the traditional knowledge is disappearing day by day, therefore, an urgent need to document to the next generation. Based on the results of this work and on the above mentioned discussion, we suggest that many medicinal plant species of middle area of Gaza Strip should be given higher priority for future research to explore their potential in the treatment of various diseases.

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References


