Original Articles

Folk Utilization of Traditional Medicinal Plants among Rural Population in Wadi Mujib – Jordan

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Abstract

The use of herbal medicine among the inhabitants of Jordan is an inherent practice. Over 100 inhabitants from 7 villages around Wadi Mujib area, 120 km south of the capital Amman, were interviewed to fill a specially designed questionnaire. The analysis of the questionnaire indicated that the inhabitants utilize about 20 plant species for treating at least 18 different ailments. The 5 most commonly used herbs -cited by more than 50% of the informants- were; Germander, Teucrium polium L.; Golden chamomile, Matricaria aurea L.; Worm wood, Artimisia herba – alba Asso; Origano thyme, Origanum syriacum L.; and Sage, Salvia triloba L. Our results show that Germander is used for treating gastro-intestinal disorders with the highest Rank Order Priority (ROP = 255). Results also indicate that the majority of inhabitants practice folk medicine without referring to herbalists. Moreover, the number of herbalists in the study area is limited. Around half of the population (57.3%) collects and grows medicinal plants. Collection of medicinal plants starts from late winter to early summer; 83.6% of inhabitants collect medicinal plants during spring (from March to June).

Keywords: Teucrium polium, Rank Order Priority, folk medicine, Jordan.

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Introduction

Until early 19th century, folk medicine was the exclusive source of all types of medication worldwide. Medicinal plants still continue to be vital to people who are still with no or little access to modern medication and pharmaceuticals.

As other natives worldwide, Jordanians- especially those living in rural areas- continue to rely heavily on traditional medicine. Jordan's flora is rich of medicinal herbs. It has been reported that 485 species from 99 families posses medicinal values. [1, 2]

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According to the WHO report (1999), the focus on the importance of medicinal plants and traditional health systems in solving health care problems is continuously progressing. [3]

The longstanding history of traditional use is the primary justification for the preference of herbal medicine. This history leads to considerable experience and knowledge about the desired effects and – though minimal – the undesired side-effects of the respective plants. There is no doubt that folk medicine is a powerful aid for treating mild conditions. Also, it provides hope for the treatment of the so-called "difficult to treat diseases". [4-7]

The interest in studying the biological effects of traditional medicinal plants and their active components has bloomed all over the world; thus leading to the establishment of comprehensive screening programs. [8] Various researchers have increasingly turned their attention to folk medicine in the hope of developing better drugs against different hard to cure illnesses including cancer, diabetes and viral/microbial infections.[9-12]

Materials and Methods

Fieldwork was conducted in Wadi Mujib Area (between Karak and Madaba districts, 120 km south of Amman), in villages surrounding Mujib Nature Reserve, during fall 2003 and spring 2004. Wadi Mujib area (220 km^2) was selected for the climatic and vegetative diversity. Moreover, the Mujib Nature Reserve, recognized by the Jordanian Royal Society for the Conservation of Nature (RSCN), lies within the Wadi Mujib study area. Interviews were carried out in the villages of Faqu', Sarfa, Al-Shqaiq, Al-Zahra, Makawer, Ed-Dair and Al-Mathlotheh. The listed villages mentioned above are not easily accessed via public transportation.

A total of 110 informants from 7 villages were interviewed using a questionnaire. The age average among the informants was ~40 years. The questionnaire focused on the ethnobotanical utilization of medicinal plants in these areas. Informants were asked to point out the 5 most commonly used medicinal plants and their uses, the parts used, the manner of preparation, the source of the medicinal plant, season of collection and the period of storage. Plant specimens collected from each site were identified with the help of the plant taxonomist, and checked with a herbarium collection at the Department of Biological Sciences, Faculty of Science in the University of Jordan. All specimen classification was verified by Professor D. Al-Eisawi, the plant taxonomist, Faculty of Science, Department of Biological Sciences. Then, each specimen was given a voucher number. The collection now is kept in the Faculty of Agriculture, University of Jordan.

Indices were determined as described in Shtayeh et al. (2000) for the classification of medicinal plants in a Rank-Order Priority (ROP), and for the determination of the Fidelity Level (FL). [13]

The FL of each plant was calculated using the following equation:

$$FL = (Ip/Iu) \times 100$$

Ip: the number of informants who independently suggested the use of a species for a particular purpose.

Iu: the total number of informants who mentioned the plant for any use.

In order to differentiate the healing potential of plants with similar FL values, a correlation index (coefficient) was calculated using the medicinal plants' Relative Popularity Level (RPL). RPL reflects the level of popularity of medicinal plants used among informants.

It was arbitrarily scaled as the following: (3) for common, (2) for frequent and (1) for occasional use. Commonly used plants were cited by > 50%, frequently used plants were cited by 25-49% and occasionally recommended medicinal herbs were cited by < 25% of the informants. [14] A co-ordinate system was utilized in which the X- axis corresponds to the number of informants citing a plant for any medicinal use, while the Y-axis corresponds to the number of different uses reported for each plant. In the present study, the Rank-Order Priority (ROP) or the correlated FL of the plants were derived from FL values using the following equation:

$$ROP = FL \times RPL$$

This aims to emphasize the level of contentment of the majority of informants regarding the healing efficiency of a given plant.

Results and Discussions

Inhabitants of Wadi Mujib area depend mainly on medicinal plants for treating their common ailments. About 96% of the interviewed individuals expressed their contentment with the used medicinal plants with regard to their efficiency and availability. The medicinal plants were regularly collected from their natural habitats for both, personal use and trading. In fact, such a practice threatens the existence of some of the endangered plant species, including species of Moringa, Rheum and Ophrys. [15]

Twenty native plant species were cited by the interviewed informants for treating 18 different ailments. The number of ailments claimed to be cured ranged from 1-10 different ailments per plant, with different FL and RPL values (Figure 1, Table 1).

The dependence on herbal medicine in such a rural area led some inhabitants to use herbs for curing an ailment even if it is not documented. Except for a few, most herbs were mainly used to treat gastro-intestinal disorders, and colds and fevers with ROP values higher than 70.

These ailments are the most common among inhabitants of such a rural area (Wadi Mujib). Most of these herbs were documented to cure such ailments. But the usages of some herbs, as cited by very few informants, were not documented. To mention few examples; *Paronychia argentia* was reported for curing gastro-intestinal disorders and colds and fevers; *Acillea santolina* for curing colds, fevers, and diabetes; *Varthemia iphionoides* and *Arum dioscoridis* for curing cancer; *Citrullus colocynthis* for curing jaundice; and *Trigonella foenum-graceum* for curing urination intermittence. Even though it is a different species, *Matricaria aurea* is used almost for the same uses of *M. chamomilla.* The confidence in the Fidelity Level values of the occasionally used herbs is questionable, as the number of informants is low. It is in our opinion that some informants' citations about certain uses are driven by their strong belief in the ability of medicinal herbs to cure such diseases.

The inherited contentment of the Mujib inhabitants with medicinal herbs efficiency led most of them to rely on folk medicine, and to try their own potions for curing a disease depending on their imagination. In many cases, when the herb proves not to be useful, they seek medical consultancy.

The five most commonly used medicinal plants include: Germander, *Teucrium polium* L.; Golden chamomile, *Matricaria aurea* (Loefl.) Schultz Bip. ; Worm wood, *Artemisia herba – alba* Asso; Origano thyme, *Origanum syriacum* L.; and Sage, *Salvia triloba* L. Germander, worm wood and sage were primarily used to control gastro-intestinal disorders while golden chamomile and oregano thyme for treating colds and fevers.

Germander is the most popularly used medicinal plant. It is used in the form of decoction, hot infusion or crushed dried leaves to achieve treatment with the highest confidence (ROP= 255) (Table 2).

Inhabitants mentioned additional uses of germander such as relieving colds and fevers, controlling diabetes and as an antimicrobial agent.

These mentioned uses of germander are well-documented in the literature. [16, 17] Germander steam bath has been reported as useful in the treatment of colds and fevers, [18,19] while the aqueous decoction of its aerial parts has been shown to significantly reduce glucose levels in blood. [10, 20-22] The literature review also confirmed the antimicrobial activity of germander, [23] and its ability to inhibit nerve conduction and skin inflammation. [24]

Other reported treatments and activities, while not reported by the inhabitants of Wadi Mujib, have been cited in the literature. Among these are: the antispasmodic activity, [23, 25] the astringent activity and wound healing properties (crushed dried leaves), [19] the anorexic activity associated with a reduction in body weight [20] and the analgesic effect of the essential oils. [9, 12] However, the variation in herb preparation played a role in determining the healing levels observed by inhabitants. Hence, the use of Germander decoction or infusion was noted to reduce the healing potentials.

The use of medicinal herbs was valued according to their respective ROP. The value of ROP is emphasized over the values of FL for the use of a particular herb. The former reflects the level of contentment among the population with the particular use of the herb. This is especially true for the commonly and frequently used herbs. It can be concluded, then, that the inhabitants are quite content with the results of *Teucrium polium*, *Artemisia herba- alba*, *Salvia triloba* and *Mentha longifolia* for the treatment of gastrointestinal disorders. These plant species received the highest ROP (255, 234, 201 and 104, respectively) among other herbs for the treatment of this specific ailment (Table 1).

Gastrointestinal disorders were also treated with *Achillea santolina* L., *Artemisia judaica* L., *Varthemia iphionoides* Boiss. & Bl., *Foeniculum vulgare* Miller, *Pimpinella anisum* L., *Rosmarinus officinal*is L., *Punica granatum* L. and *Cuminum cyminum* L. but with lower ROP values (Table 1). For treating kidney and bladder stones, the inhabitants were content with *Paronychia argentea* Lam. which received ROP value of 170. *Eryngium creticum* Lam. is occasionally mentioned as a treatment used for treating urinary system ailments. For relieving symptoms of cold and fevers, *Origanum syriacum* L. and *Matricaria aurea* (Loefl.) received high ROP values; 147 and 123, respectively.

It is worthy mentioning that ROP values of the occasionally used plants do not reflect a high level of confidence, as these herbs were cited only by < 25% of the informants. Their uses among inhabitants were only included as a notion to be considered in future research.

Most of the informants considered referral to a physician or a pharmacist upon failure to get relief of an ailment using traditional medicinal plants. Only 15.5% of the informants were aware of the association of a risk of adverse effects/misuse with such therapy. These disadvantages of medicinal herbs are particularly observed after the consumption of large quantities or the treatment for prolonged periods (Table 2). The mentioned side effects include allergies, abortion, constipation, difficulties in responding to anesthesia and drowsiness. The most frequently reported side effect of medicinal plants by the inhabitants of Wadi Mujib area was difficulties in responding to anaesthesia. This might be due to the analgesic effect of the essential oils of these medicinal plants. The vegetative parts of medicinal plants were the preferred plant parts used among Mujib area inhabitants. Infusion and/or decoction were the common methods of preparation. Table (3) lists the plant parts and methods of preparation of the studied plants.

Two factors ensure that folk medicine will stay in practice among rural populations in Jordan; firstly, the inherited contentment with folk medicine and, secondly, the prevailing low income which, in turn, disables most rural populations from affording the expenses of orthodox medicine. Recently, the Jordanian government sponsored many projects for conserving plant biodiversity (especially medicinal plants) and for recommending the cultivation of indigenous medicinal plants. [27]

Such conservation projects would limit the uncontrolled collection of medicinal plants and encourage rural communities to invest in their cultivation. Few farms have already been established to cultivate oregano thyme, sage, and other medicinal herbs.

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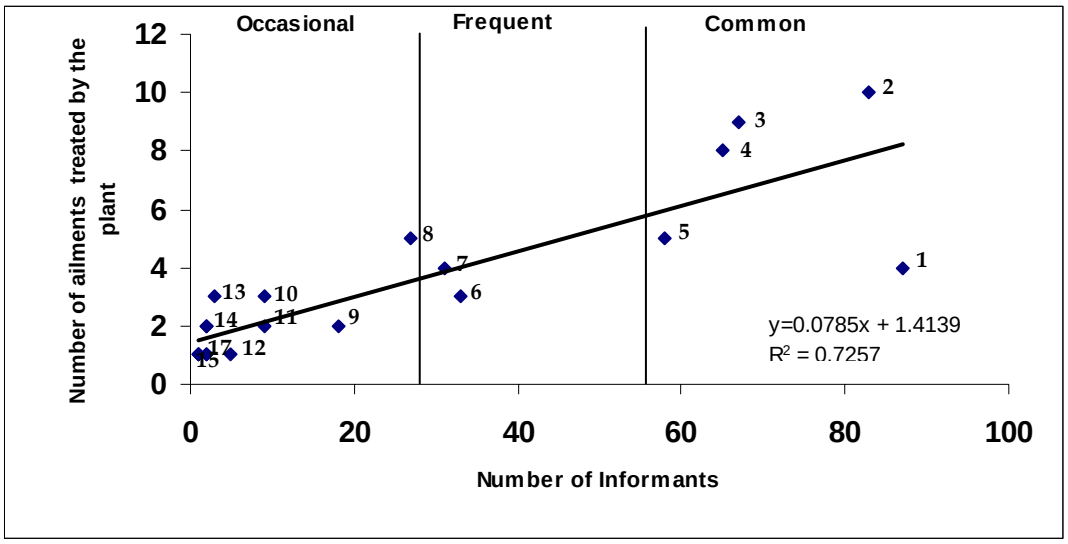

Figure 1: Relationship between number of informants and number of ailments treated by a particular plant. Number at each point represents the medicinal herb listed in Table 1.

Table 1. List of medicinal plants used in Wadi Mujib area, treated ailments, number of informants citing the treatment, Fidelity Level (FL), Relative Popularity Level (RPL) and Rank Order Priority (ROP) values.

Plant #	*Plant Species (Family)*	*Arabic Name*	*Ailment **	*# of Informants Citing the Use*	*FL*	*RPL*	*ROP*
1	***Achillea santolina L.***	*Kaisoom*	*9*	*21*	*78*	*1*	*78*
	(Compositae/Asteraceae)		*6*	*3*	*11*	*1*	*11*
			10	*1*	*4*	*1*	*4*
			7	*1*	*4*	*1*	*4*
2	***Artemisia herba- alba***	*Sheih*	*9*	*45*	*67*	*3*	*201*
	Asso.		*7*	*12*	*18*	*3*	*54*
	(Compositae/Asteraceae)		*6*	*11*	*16*	*3*	*48*
			18	*2*	*3*	*3*	*9*
			15	*2*	*3*	*3*	*9*
			13	*2*	*3*	*3*	*9*
			2	*1*	*1*	*3*	*3*
			12	*1*	*1*	*3*	*3*

3	***Artemisia judaica L. (Compositae/Asteraceae)***	*Baitharan*	*9*	*18*	*100*	*1*	*100*
			7	*1*	*6*	*1*	*6*
4	***Arum dioscoridis Sibth. &Sm. (Araceae)***	*Rgaitah*	*11*	*2*	*100*	*1*	*100*
			5	*1*	*50*	*1*	*50*
5	***Arum hygrophilum Boiss. (Araceae)***	*Loof*	*14*	*1*	*33*	*1*	*33*
			5	*1*	*33*	*1*	*33*
6	***Citrullus colocynthis (L.) Schrader (Cucurbitaceae)***	*Handal*	*11*	*1*	*100*	*1*	*100*
7	***Cuminum cyminum L. (Umbelliferae/ Apiaceae)***	*Kammon*	*9*	*1*	*100*	*1*	*100*
8	***Eryngium creticum Lam.***	*Gartam*	*16*	*2*	*100*	*1*	*100*
9	***Foeniculum vulgare Miller (Umbelliferae/Apiaceae)***	*Shomar*	*9*	*7*	*88*	*1*	*88*
			15	*1*	*13*	*1*	*13*
10	***Matricaria aurea (Loefl.) Schultz Bip. (Compositae/Asteraceae)***	*Baboonej*	*6*	*34*	*41*	*3*	*123*
			9	*27*	*33*	*3*	*99*
			13	*21*	*25*	*3*	*75*
			2	*3*	*4*	*3*	*12*
			4	*3*	*4*	*3*	*12*
			15	*2*	*2*	*3*	*6*
			8	*2*	*2*	*3*	*6*
			1	*1*	*1*	*3*	*3*
			3	*1*	*1*	*3*	*3*
11	***Mentha longifolia L. (Labiatae/Lamiaceae)***	*Na'na barri*	*9*	*16*	*52*	*2*	*104*
			6	*11*	*35*	*2*	*70*
			12	*1*	*3*	*2*	*6*
12	***Origanum syriacum L. (Labiatae/Lamiaceae)***	*Za'tar*	*6*	*32*	*49*	*3*	*147*
			13	*23*	*35*	*3*	*105*
			9	*3*	*5*	*3*	*15*
			2	*3*	*5*	*3*	*15*
			4	*2*	*3*	*3*	*9*
			15	*1*	*2*	*3*	*6*
			3	*1*	*2*	*3*	*6*
13	***Paronychia argentea Lam. (Caryophyllaceae)***	*Rejl elhamameh*	*16*	*28*	*85*	*2*	*170*
			9	*5*	*15*	*2*	*30*
			6	*1*	*3*	*2*	*6*
14	***Pimpinella anisum L. (Umbelliferae/Apiaceae)***	*Yansoon*	*9*	*5*	*100*	*1*	*100*
15	***Punica granatum L. (Punicaceae)***	*Rumman*	*9*	*1*	*100*	*1*	*100*
16	***Rosmarinus officinalis L. (Labiatae/ Lamiaceae)***	*Heselban*	*9*	*2*	*100*	*1*	*100*
17	***Salvia triloba L. (Labiatae/Lamiaceae)***	*Mairameyeh*	*9*	*45*	*78*	*3*	*234*
			6	*9*	*16*	*3*	*48*
			15	*2*	*3*	*3*	*9*
			12	*1*	*2*	*3*	*6*
18	***Teucrium polium L. (Labiatae/Lamiaceae)***	*Ja'adeh*	*9*	*74*	*85*	*3*	*255*
			7	*10*	*11*	*3*	*33*
			6	*4*	*5*	*3*	*15*
			3	*1*	*1*	*3*	*3*

19	***Trigonella foenum-graceum L. (Leguminosae/Fabaceae)***	*Helbeh*	*15*	*1*	*50*	*1*	*50*
			17	*1*	*50*	*1*	*50*
20	***Varthemia iphionoides Boiss. & Blanche (Compositae/Asteraceae)***	*Ketaileh*	*9*	*6*	*67*	*1*	*67*
			5	*3*	*33*	*1*	*33*
			8	*1*	*11*	*1*	*11*

****numbers in this column indicate the ailment number for which the plant is used. Ailment numbers: 1- Allergy, 2- Anti-inflammatory, 3- Antimicrobial, 4- Aseptic- external, 5- Cancer, 6- Colds and fevers, 7- Diabetes, 8- Eye disorders, 9- Gastro-intestinal disorders, 10- Hair dandruff- external, 11- Jaundice, 12- Dysmenorrhoea. 13- Respiratory system disorders, 14- Rheumatic pain- external, 15- Tonic, 16- Kidney and bladder stones, 17- Urination intermittence, 18- Wound healing-external***

Table 2: Adverse effects of some medicinal plants, as reported by the informants.

Plant Species	*Adverse Effects**
Achillea santolina	*1*
Artemisia herba – alba	*1, 2*
Matricaria aurea	*1, 3*
Mentha longifolia	*1, 4*
Origanum syriacum	*1, 5*
Salvia triloba	*6, 7, 8*
Teucrium polium	*1, 7*
Trigonella foenum-graceum	*1*

****Numbers in this column indicate the adverse effects observed with the plants used.***
1- Central Nervous System effects (difficulties in responding to anaesthesia), 2- Visual disturbances, 3- Diarrhoea, 4- Abortion, 5- Allergies, 6- Kidney problems, 7- Constipation, 8- Drowsiness.

Table 3. Uses, methods of preparation and parts used of the most commonly used medicinal plants in Wadi Mujib area.

Plant Species	*Parts Used*	*Method of Preparation*	*Use*
Achillea santolina	*Aerial parts*	*Infusion, decoction*	*If needed*
Artemisia herba- alba	*Aerial parts*	*Infusion*	*If needed*
Artemisia judaica	*Aerial parts*	*Infusion*	*If needed*
Arum dioscoridis	*Leaves*	*Infusion, decoction*	*If needed*
Arum hygrophilum	*Leaves*	*Infusion, cooked*	*If needed*
Citrullus colocynthis	*Fruits*	*Infusion*	*If needed*
Cuminum cyminum	*Seeds*	*Infusion*	*Daily*
Eryngium creticum	*Aerial parts*	*Infusion*	*If needed*
Foeniculum vulgare	*Aerial parts*	*Infusion*	*If needed*
Matricaria aurea	*Aerial parts*	*Infusion*	*If needed*
Mentha longifolia	*Leaves, aerial parts*	*Infusion, decoction*	*Daily*
Paronychia argentea	*Aerial parts*	*Infusion*	*If needed*
Pimpinella anisum	*Seeds*	*Infusion*	*If needed*
Punica granatum	*Flowers*	*Infusion*	*If needed*
Rosmarinus officinalis	*Aerial parts*	*Decoction*	*If needed*
Salvia triloba	*Leaves, aerial parts*	*Infusion, decoction*	*Daily*
Teucrium polium	*Aerial parts*	*Infusion, decoction, dry crushed leaves*	*If needed*
Thymus vulgaris	*Leaves, aerial parts*	*Infusion, decoction*	*If needed*
Trigonella foenum-graceum	*Aerial parts, seeds*	*Infusion*	*Daily, Weekly*
Varthemia iphionoides	*Aerial parts*	*Infusion, decoction*	*If needed*

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