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Identification of medicinal plants effective in infectious diseases in Urmia, northwest of Iran

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ABSTRACT

Objective: To identify the medicinal plants effective in infectious diseases.
Methods: Initially, we obtained a list of herbalists and traditional healers from Food and Drug Deputy. Direct observations and interviews as well as collection of herbarium specimens of indigenous medicinal plants effective in infectious diseases of urinary tract, reproductive, digestive, respiratory and skin systems were performed. This study was conducted through questionnaires and interviews; the questionnaires were distributed among traditional healers and simultaneous interviews were also run. The plants were herbariumized, herbarium specimens were authenticated, and their species were determined by using reliable flora and other sources. Finally, the data were input into Excel 2010 and analyses were performed.
Results: Out of the studied plants, 35 native medicinal plants belonging to 17 families were effective in the treatment of various diseases and infections. In this study, the Lamiaceae family had the highest frequency of plants for the treatment of infections. Traditional healers of Urmia in 24% of cases used the leaves of medicinal herb to treat patients. In 68% of cases, they prescribed medicinal herbs in the boiled forms. Most medicinal herbs showed therapeutic effect on the digestive system.
Conclusions: Traditional medicinal sources, valuable knowledge of traditional healers in Urmia, the scientific investigation of the effects of the herbs offered in this study and their effects in traditional medicine may provide a good source for new drugs in modern medicine.

1. Introduction

One of the most important challenges in human health is infectious diseases due to their high incidence and outbreak rate [1].

One of the most common human infections is urinary tract infection (UTI) which requires urgent and continuous treatment [2]. UTI is an infection involving the kidneys, ureters, bladder or urethra. These are the structures through which urine passes before being discarded from the body. If the disease develops with no effective treatment, its complications progress and may result in kidney failure. The most common pathogens causing UTIs are *Escherichia coli* (*E. coli*) and other Enterobacteriacae bacteria such as *Klebsiella* [3]. About 250 million people are estimated to suffer from UTIs annually. In addition, 20%–50% of adult women are projected to have had at least one symptomatic UTI [4].

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The significant reasons for UTIs may include the possibility of septicemia, congenital anomalies of the urinary tract such as posterior urethral valve, ureteropelvic junction obstruction, ureterocele, and other obstructive uropathies as predisposing factors for frequent infection, damage of kidney tissue or vesicoureteral reflux which can cause kidney-induced hypertension, growth failure, and renal failure.

Bacterial vaginosis is the most common vaginitis in women of reproductive age. Bacterial vaginosis is caused by a complex alteration in vaginal flora in which hydrogen peroxide-producing lactobacilli decrease and anaerobic pathogens overgrow. Although one half of bacterial vaginosis patients are asymptomatic, the symptoms include a gray, thin, fishy-smelling vaginal discharge and itching. Diagnosis is confirmed by testing vaginal secretions. Bacterial vaginosis appears to increase the risk of pelvic inflammatory diseases, postabortion and postpartum endometritis, post-hysterectomy vaginal cuff infection, chorioamnionitis, premature rupture of membranes, preterm labor, and preterm birth [5].

The incidence of invasive fungal infections has been increased during the past three decades. One of these infections is vulvovaginal candidiasis infection. This disease is considered as the second most common vaginal infection involving approximately 75% of women in lifetime. Moreover, in 50% of patients, the infection occurs at age of 25 years. The most common symptom is vaginal itching that may be severe. Other symptoms include burning urination, white and thick vaginal discharge with typically no bad smell, painful intercourse, and redness around the vagina [6].

In recent years, yeasts and particularly candidate species have emerged as one of the most common pathogens isolated from human infections [7].

Diarrheal diseases, after respiratory infections, are the second leading cause of mortality worldwide. Diarrhea is one of the most common diseases in children, especially in developing countries with poor sanitation and/or poor personal hygiene standards. Globally, there are nearly 500 million pediatric cases of diarrheal disease under the age of 5 years every year, of whom two million die. Gastroenteritis or infectious diarrhea is a medical condition from inflammation of both stomach and small intestine. It causes some combination of diarrhea, vomiting, dehydration, abdominal pain, and cramping. Gastroenteritis has been referred to as gastro, stomach bug, and stomach virus. Globally, most cases in children are caused by rotavirus, whereas in adults norovirus and campylobacter are more common. Less common causes include other bacteria and parasites. Generally, the Enterobacteriaceae family, rotavirus and *Giardia lamblia* are the main bacteria, virus, and parasite, respectively that can cause diarrhea. Transmission may occur via consumption of improperly prepared food or contaminated water or due to close contact with the infected [8].

Most synthetic drugs are produced by imitating the herbal medicines, but they are produced artificially in pharmaceutical laboratories. At least one third of all used products have plant origin. The use of plants as natural, safe, accessible and inexpensive materials, compared to synthetic antibiotics, has been growing for the treatment of bacterial infections. Also, herbal medicines have more popularity to the people compared with chemical ones [9].

Medicinal plants have been shown as a good source for development of new drugs [10–15]. They have demonstrated promising effects in a wide variety of diseases such as cancer [16,17], diabetes [18,19], atherosclerosis and cardiovascular diseases [20–23], learning and cognitive complications [24–26], and wounds [27–29]. Furthermore, medicinal herbs are also effective in prevention and treatment of the toxicity induced by other drugs or toxins [30–37]. Medicinal plants are a rich source of bioactive substances, antioxidants, flavonoids, and phenolic substances and have multiple health effects [12,38–55].

With pristine nature and unique flora, Urmia is one of the most significant regions in Iran with widespread and rich source of medicinal plants frequently used for treatment of various infectious diseases. In this study, we seek to identify medicinal plants that are used for treatment of various infections.

2. Materials and methods

This study was conducted via questionnaires and interviews from November, 2013 to February, 2014 in Urmia, Iran. Initially, we obtained a list of traditional healers of Urmia from Food and Drug Deputy. Direct observation and interviews as well as collection of herbarium specimens of indigenous medicinal plants effective in the treatment of infectious diseases of urinary tract, reproductive, digestive, respiratory, and skin systems were performed. The questionnaires were distributed among traditional healers and simultaneous interviews were also run.

After collection of traditional and therapeutic data about the plants mentioned in each questionnaire, different plant specimens were collected, dried and herbariumized. Herbarium specimens were identified and their species were determined by using reliable sources and flora such as Ghahreman, flora of Iranica, flora of Turkey [56], and flora of Iraq [57]. Finally, the data obtained from the questionnaires were input into Excel 2010 and the frequency of family, used plant parts, traditional usage form, and frequency of the treated diseases were analyzed.

3. Results

After finalizing and analyzing the collected data from questionnaires and interviews, comprehensive information such as scientific name, local name, the used parts and different ways of application, and anti-infective therapeutic effects in various body systems was derived.

Overall, 35 medicinal plants were identified for the effective antibacterial and anti-infectious properties in urinary tract, reproductive, digestive, respiratory, and skin systems (Table 1).

The analysis results of 35 traditionally medicinal plants with anti-infectious and antimicrobial property used in the present study showed 17 plant families in Urmia carried antimicrobial and anti-infectious effects. Based on the data of the studied medicinal plants, Lamiaceae family demonstrated the most frequency out of other plant families (Figure 1).

Data analyses showed that traditional healers of Urmia in 24% of cases already knew that the leaves of medicinal herb had therapeutic effects. In 68% of cases, they prescribed medicinal herbs in the boiled form. The results also revealed that most of medicinal herbs showed therapeutic effect on the digestive system.

Details about used parts, the ways of usage, and the percentage of medicinal plants effective in different body systems were illustrated in Figures 2–4.