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Identification of Important Herbs for Anti-fever Treatment: An Ethnobotanical Study of Sojas Rud, Northwest Iran

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ABSTRACT

Introduction: Fever is a common symptom in several diseases. Medicinal plants have a long history in dealing with diseases. Hence, the objective of this ethnobotanical study was to identify herbs used for the management of fever in Sojas Rud district in Khodabandeh County, Zanjan province, Northwest Iran.

Methods: This ethnobotanical study was carried out in Sojas Rud district in Khodabandeh County, Zanjan province, Northwest Iran. Collection of ethnobotanical information as done through interviews and questionnaires among 22 traditional healers. Demographic information wes also collected. The data were analyzed by Excel.

Results: Our findings revealed that 10 medicinal herbs including *Anthemis nobilis* L., *Centaurea depressa* L., *Crataegus monogyna*, *Descurainia Sophia* L., *Elaeagnus angustifolia* L, *Gundelia tourneforti* L., *Nasturtium officinalis*, *Orchis latifolia* L., *Plantago lanceolata* L., and *Salix* spp. from 7 families had a considerable effect in the management of fever. We have also observed that the medicinal herbs in Asteraceae, Rosaceae, Brassicaceae, Elaeagnaceae, Orchidaceae, Plantaginaceae, and Saliaceae families had the effect on controlling fever. Furthermore, our results demonstrated that the flower, stem, fruit, seed, leaf, aerial parts, tuber, root, and bark of these plants were the effective parts, respectively. In addition, most forms of preparation of these plants were decoction, fresh, infusion, cooked, and syrup, respectively.

Conclusion: The presented study revealed the remarkable effect of some new medicinal plants against fever. Therefore, further studies in the field of investigating the effects of medicinal plants on fever with the approach of identifying the role of the phytochemical constituents of these plants and their effective mechanisms on fever treatment can be a way forward.

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Intorduction

Fever is one of the common side effects of diseases, even in some cases, its cause may remain unknown and its origin may not be determined in diagnostic investigations. Fever can be considered as the oldest clinical symptom of diseases all over the world (Wright et al., 2020). Fever is defined as the body's response to pathogenic conditions such as infection, inflammation and trauma. Although fever is defined as an increase in body temperature, not all increases in body temperature are considered as fevers (Ogoina, 2011; Porusia M, Septiyana et al., 2021). It is common knowledge that fever is known as a state of elevation in body temperature which is often defined as a biological response to pathogenic microorganisms (Roth et al., 2014; Asgarisavadjani et al., 2020). In the literature there are a surprising number of evidence about the therapeutic role of antipyretic agents such as salicylates, non-steroidal anti-inflammatory drugs (NSAIDs) and acetaminophen in the treatment of fever (Prajitha et al. 2019). However, a growing body of literature has reported several types of side effect following administration of antipyretic drugs (Dathe et al.,m 2019). Due to the harmful side effects of some chemical drugs, many patients have turned to herbal medicine for treatment. Nowadays, medicinal plants are in the attention of scientific and research centers due to their special position in the health of society (Chandra et al., 2020). Traditional medicine and ethnobotany are two topics of interest in many countries. Ethnobotany aims to systematically record and write down the narrative and unstructured botanical knowledge of indigenous communities, which was formed through trial and error and recorded in the memory of their collective culture (Popović et al., 2016; Baharvand Ahmadi et al. 2023; Salavatian et al. 2023; Saki et al. 2023). Medicinal plants have played an undeniable role in the treatment and prevention of human diseases for a long time (Ozkan et al., 2016). Medicinal plants with antioxidant compounds such as phenolic, and flavonoid compounds, tannins, anthocyanins, and some other bioactive compounds are widely used in the treatment of various diseases. Indeed, medicinal plants are rich sources of natural active ingredients as therapeutic agents (Farag et al., 2020). The purpose of this study was to identify some important medicinal plants that are widely used by the local residents of Sojas Rud region in the treatment of fever.

Materials and Methods

Area of Study

The current survey was carried out in Sojas Rud district is in Khodabandeh County, Zanjan province, Northwest Iran. Sojas Rud district covers 36°16′57″N to 48°33′29″E geographical coordinates (Figure 1).

Data Collection

This ethnic research was conducted from April 2011 to May 2011. This study was conducted through the researcher's visit in the region and in the form of an interview with a self-made questionnaire among 22 traditional medicine healers (fifteen men and 7 women). First, the ethnobotanical questionnaire was distributed among traditional healers. The questionnaires contained demographic information. The questioners tried to write down the herbal beliefs of the ethnographic information. The results obtained from the questionnaires were recorded. Finally, herbal treatment information was subjected to data analysis using Excel software (Baharvand Ahmadi et al. 2016).

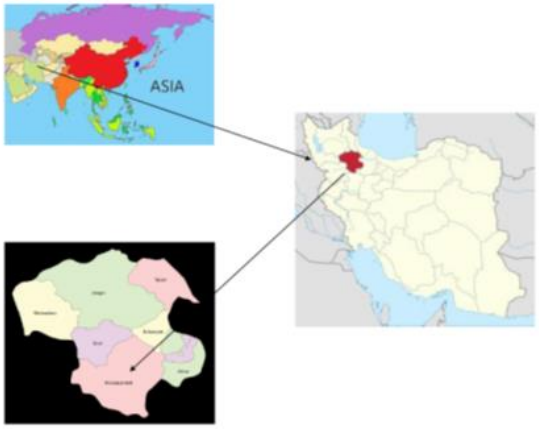

Figure 1. Location of study area, Sojas Rud district, in Iran map

Results

We found that ten medicinal herbs from seven families were used for treatment of fever (Table 1). Our findings has further suggested that the medicinal herbs in Asteraceae, Rosaceae, Brassicaceae, Elaeagnaceae, Orchidaceae, Plantaginaceae, and Saliaceae families were introduced as antipyretic agents (Table 2). In addition, our results showed that flower (15%), stem (15%), fruit (15%), seed (14%), leaves (14%), aerial parts (7%), tuber (7%), root (7%), and bark (7%) were the most usable part of medicinal plants for the treatment of fever (Figure 2). Furthermore, our results revealed that decoction (40%), fresh (27%), infusion (13%), cooked (13%), and syrup (7%) were the most common forms of using medicinal plants, respectively (Figure 3).

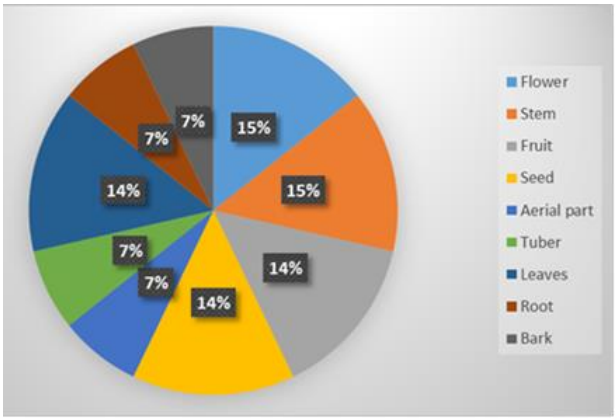

Figure 2. The percentage of plant organs used traditionally as anti-fever in Sojas Rud district

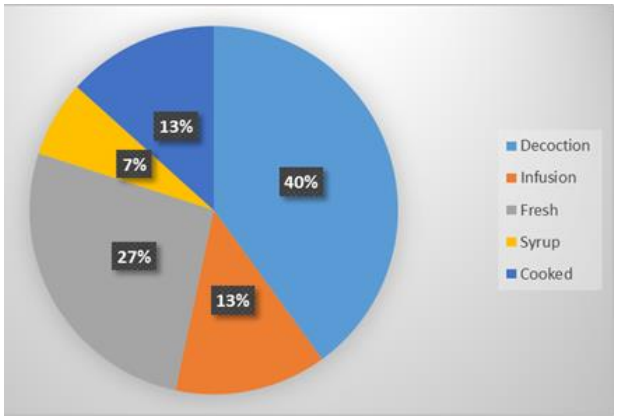

Figure 3. The percentage of the most common forms of using medicinal plants in Sojas Rud district as anti- fever

Table 1. Medicinal plants used for the management of fever in Sojas Rud district

Scientific Name	Family	Persian Name	Usable Part of Plant	Preparation Methods
Anthemis nobilis L.	Asteraceae	Babooneh	Flower	Decoction & Infusion
Centaurea depressa L.	Asteraceae	Gole Gandom	Stem	Decoction
Crataegus monogyna	Rosaceae	Zalzalak	Flower and Fruit	Fresh & Infusion
Descurainia sophia L.	Brassicaceae	Kjakeshir Irani	Seed	Syrup
Elaeagnus angustifolia L.	Elaeagnaceae	Senjed	Fruit	Fresh
Gundelia tourneforti L.	Asteraceae	Kangar	Stem	Fresh & Cooked
Nasturtium officinalis	Brassicaceae	Alafeh Cheshmeh	Aerial parts	Fresh & Decoction
Orchis latifolia L.	Orchidaceae	Taalab	Tuber	Cooked & Decoction
Plantago lanceolata L.	Plantaginaceae	Barhang	Flower, seed, root	Decoction
Salix spp.	Saliaceae	Bid	Leaves and Bark	Decoction

Table 2. Distribution of plant families with traditional anti-fever effects in Sojas Rud district

Herbal family	Number
Asteraceae	3
Rosaceae	1
Brassicaceae	2
Elaeagnaceae	1
Orchidaceae	1
Plantaginaceae	1
Saliaceae	1

Discussion

In the literature there are a surprising number of investigations about the beneficial role of medicinal plants in the treatment of various diseases such as fever. Nowadays, there has been growing interest in the use of different medicinal plants for the treatment of fever (Lediga et al., 2018). There are several pieces of evidence about numerous biological properties of these effective phytochemical constituents such as anti-oxidant, anti-inflammatory, anti-bacterial, anti-fungal, anti-viral, anti-parasite, anti-cancer, immunomodulatory and wound healing effects (Boy et al., 2018). Hence, the aim of this ethnobotanical study was to study the most important medicinal plants used for anti-fever treatment in Sojas Rud district in Khodabandeh County, Zanjan province, Northwest Iran. This ethnobotanical study was the first survey that identify the main medicinal plants used for management of fever in Sojas Rud region. Our findings point to the usefulness of medicinal plants as antipyretic agents. These results offer compelling evidence for the use of herbal plants for the remedies of diverse types of disorders such as fever. The results of the current ethnobotanical study highlighted that ten medicinal herbs including *Anthemis nobilis* L., *Centaurea depressa* L., *Crataegus monogyna*, *Descurainia Sophia* L., *Elaeagnus angustifolia* L., *Gundelia tourneforti* L., *Nasturtium officinalis*, *Orchis latifolia* L., *Plantago lanceolata* L., and *Salix* spp. were used as antipyretic agents for the treatment of fever in Sojas Rud region. We also understood that the herbal plants in Asteraceae, Rosaceae, Brassicaceae, Elaeagnaceae, Orchidaceae, Plantaginaceae, and Saliaceae families were the most effective plants for the treatment of fever. Furthermore, we found that the medicinal plants in Asteraceae and Brassicaceae were the most used in the treatment of fever in Sojas Rud region. In addition, the results of our study indicated that some parts of these plants including flower, stem, fruit, seed, leaves, aerial parts, tuber, root, and bark were used more for the treatment of fever. It has been also shown that the above mentioned medicinal plants were used mostly in the form of decoction, fresh, infusion, cooked, and syrup, respectively. The results of the study of Asadi-Samani and colleagues in complete agreement with our findings revealed the effectiveness

of Iran's medicinal herbs on fever in children. The authors exhibited that eight medicinal herbs including *Matricaria recutita, Achillea millefolium, Sambucus nigra, Tilia Cordata, Hyssopus officinalis, Allium sativum, Lavandula officinalis,* and *Mentha piperita* in Iran have remarkable therapeutic effect on fever in children. In addition, our results share number of similarities with Asadi-Samani al.'s findings. The results of other study in line with our findings demonstrated that the medicinal herbs in Asteraceae family showed the greatest effect against fever (Mohsenzadeh et al., 2016). There are a growing body of evidence about the numerous biological properties of *Anthemis nobilis*. For instance, it has been reported that *Anthemis nobilis* as an important medicinal plant in Asteraceae family has a significant inhibitory effect on the growth of microbial strains (Ebani et al., 2017). Previous studies have shown the crucial role of microbial pathogens in the development of fever (Ebani et al., 2017). It has been documented that *Anthemis nobilis* contained flavonoids, catechins, phenolic acids, coumarins, triterpenes and other beneficial phytochemical constituents. These bioactive compounds exert several therapeutic properties such as antioxidant and antibacterial effects (Silveira et al., 2022; Fazeli-Nasab et al., 2022; Ebrahimi et al., 2022; Altememy et al., 2023). Indeed, it can be concluded that antipyretic effect of medicinal plants including above mentioned herbs are associated with the presence of phytochemical constituents (Hao et al., 2020).

Conclusions

The current work demonstrated that several species of medicinal plants can treat fever. The results of our study have led us to conclude that medicinal plants can be used as reliable sources to fight fever. The evidence from this study points towards the idea that medicinal plants can replace chemical medicines with frequent side effects. Taken together, our study provides the framework for a new way to treat fever via administration of medicinal plants. We hope that further tests will confirm our findings.

Declarations

Conflict of interest

There is no conflict of interest among the authors.

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Consent for publications

The authors approved the manuscript for publication.

Funding/support

None.

Authors' contributions

MA, ND conceived the research idea and FKH and ND designed the work. MA carried out the questionnaire, FKH and ND wrote the first draft of the manuscript, FKH carried out the literature search, MA carried out the statistical analysis, and ND supervised the study. All authors read and approved the final manuscript for publication.

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the author.

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