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Research Article

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Medicinal Plants in the Treatment of Digestive Diseases in Morocco: Knowledge and Practices

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Abstract

Introduction: The use of medicinal plants and phytotherapy is characterized by its popularization and scientific and legislative neglect. The aim of this study is to evaluate the state of the art of the use of medicinal plants by the Moroccan population to treat digestive tract disorders.

Materials and Methods: We performed a descriptive cross-sectional study of 410 Moroccan citizens. Data were collected through an electronic questionnaire distributed online. The participants also indicated their socio-demographic data, their knowledge and their practices towards medicinal plants that they use to treat digestive disorders.

Results: The mean age of our participants was 34 years with a marked female predominance (57.8%). The ethnobotanical investigation revealed that the digestive symptoms justifying the use of medicinal plants were dominated by epigastralgia (45.9%), atypical abdominal pain (32.2%), bloating (44.9%), diarrhea (34.6%) and constipation (26.3%). The taxonomic identification of plants used has identified 32 species of which the most represented are thymus vulgaris (72.19%), followed by cumimumcymimum (58.54%), then comes pimpinellaanisum (50.73%) and rigonellafoenum-graecum (49.02%). The improvement of symptoms by these plants was mentioned by most of the participants (73.9%). The majority of the respondents (60%) affirmed that there were no side effects related to these plants.

Conclusion: Our results confirm the need to pay attention to the use of medicinal plants in our context. Firstly, the efficacy and safety of these medicinal plants must be verified through scientific research. Moreover, like medicines, the use of these plants must obey legislative rules involving the regulation of the profession in our country.

Keywords: Medicinal plants; Digestive diseases; Morocco

Introduction

Since ancient times, plants have been used as medicines. Medicinal plants are valuable resources for the vast majority of rural populations in Africa, where more than 80% of the population uses them for health care [1,2]. In Morocco, medicinal plants occupy an important place in traditional medicine. Indeed, Morocco is one of the Mediterranean countries that has a traditional expertise in medicinal plants [3,4].

In this objective, we aim through this study carried out on a national scale to provide the current state of therapeutic uses of

medicinal plants in the treatment of digestive system disorders and diseases.

Materials and Methods

Participant characteristics

We conducted a descriptive transversal study based on an online questionnaire. All participants were adults over the age of 18, resident in Morocco. To have a representative national sample, we interviewed citizens across different regions of Morocco.



Study procedure

Study announcements, containing brief information about the study and a link to a questionnaire, were shared via email (to personal and professional networks), and posted on Facebook and other popular social media websites, including Twitter and Instagram to have a diverse sample. The online questionnaire was administered via Google Forms to ensure wide reach and easy access. Participants were asked to share the questionnaire with their families and contacts.

Responses to all questionnaire items were required, and respondents could only submit their responses if all questions were answered. The data reported in this study were collected between May and September 2021.

Ethical approval

Results

Table 1: Description of participants (n= 410).

Variable	Number	Percentage
Age (years)	Mean \pm standard deviation	34 \pm 15
	Extremes	18 - 65
Gender	Male	173
	Female	237
Matrimonial status	Single	278
	Married	128
	Divorced	4
Level of education	Out of school	0
	Primary	2
	Secondary	30
	University	378
Location of residence	Urban	324
	Rural	86
Socioeconomic level	Low	10
	Medium	370
	High	30

Four hundred and ten participants completed the questionnaire. Table 1 presents the descriptive characteristics of the participants. The average age was 34 years (\pm 15). The majority of participants were female (57.8%), single (67.8%), had a university degree (92.2%) and lived in urban areas (79%) (Table 1).

Table 2: Use of medicinal plants (n= 410).

Variable	Number	Percentage
When you are sick, what do you prefer?	Taking a medical treatment	134
	Taking herbal remedies alone	62
	Taking both	214

Participation was voluntary, and all participants gave informed consent electronically and without compensation for participation. No identifying information was collected to protect the anonymity of participants.

Variables studied

Participants provided their socio-demographic characteristics, such as gender, age, education level and location (rural or urban). They also reported their knowledge and use of medicinal plants to treat symptoms and diseases of the digestive tract, including the type and method of preparations used, their therapeutic benefits and possible toxicities.

Statistical analysis:

We report descriptive statistics for the study variables. Analyses were performed by IBM SPSS Statistics v 21 software.

Concerning the use of medicinal plants Table 2: 15.12% prefer to take medicinal plants alone when they fall ill and 52.2% combine them with a medical treatment. 64.4% of the respondents turn to the experiences of the family circle to use medicinal plants. More than two thirds of the participants use medicinal plants because they are natural (Table 2).

When you want to use medicinal plants, you turn to?	To the family circle	264	64,4%
	To the internet	174	42,44%
	To herbalists	25	6,1%
	Other (pharmacist, books, other people's experiences...)	262	64%
Why do you use medicinal plants?	Natural	284	69,26%
	Effective	112	27,32%
	Less expensive	66	16,10%
	More accessible	54	13,17%
Have you ever used herbal medicines to treat digestive tract disorders	Yes	354	86,3%
	No	56	13,7%

The majority of respondents (86.3%) had already used plants to treat digestive disorders. The patients in our series used a single plant (87.5%), while 12.5% used a combination of several medicinal plants. The digestive symptoms justifying the use of medicinal

plants were dominated by epigastralgia (45.9%), atypical abdominal pain (32.2%), bloating (44.9%), diarrhea (34.6%) and constipation (26.3%) (Figure 1).

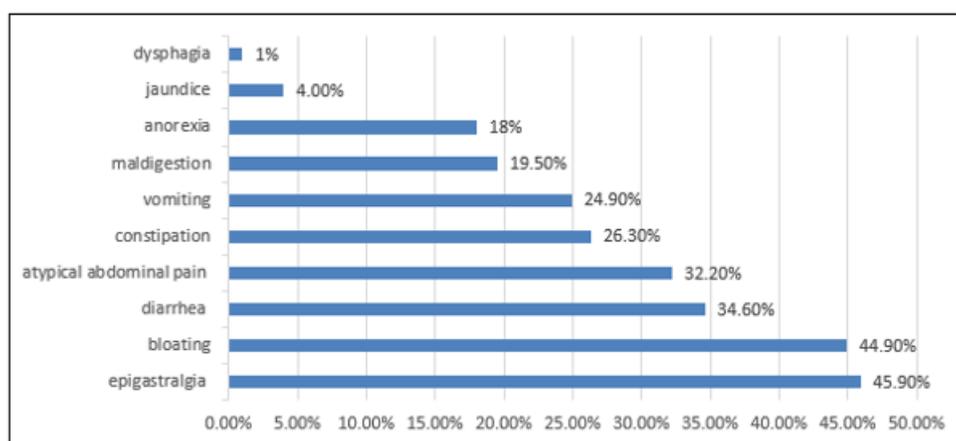


Figure 1: Distribution of digestive symptoms treated with medicinal plants.

The participants counted several species of medicinal plants that were used. Table 3 represents the most common species belonging to nine botanical families. It includes scientific names, ver-

nar names, names based on the APG III system (Angiosperm phylogeny group, APG III, 2009), as well as the part used and the method of preparation (Table 3).

Table 3.

Family (APGIII)	Vernacular name	Vernacular name in Morocco	Common name	Part used	Preparation method	Photo
Apiaceae	<i>Pimpinella anisum</i>	Nafaa	Aniseed	Grains	Powder/ Infusion	
	<i>Cuminum cyminum</i>	Kamoun	Cumin	Grains	Powder/ infusion	
	<i>Apium graveolens</i> var. <i>dulce</i>	Krafas	Celery	Leaves /Racins	Decoction/ infusion	

Lamiaceae	<i>Thymus vulgaris</i>	Zaatar	Thyme	Leaves	Decoction/ infusion	
Verbenaceae	<i>Verbena officinalis</i>	Louiza	Verbena	Leaves	Infusion	
Lamiaceae	<i>Salvia rosmarinus</i>	Azir	Rosemary	Leaves	Infusion	
Fabaceae	<i>Trigonella foenum-graecum</i>	Halba	Fenugreek	Grains/Powder	Decoction/ Infusion	
Asteraceae	<i>Artemisia vulgaris</i>	Chih	Wormwood	Leaves/flowering tops	Infusion	
	<i>Chamaemelum nobile</i>	Babounj	Chamomile	Flowers	Decoction/ Infusion	
Umbelliferae	<i>Carum carvi</i>	Karwia	Caraway	Grains	Infusion	
Zingiberaceae	<i>Zingiber officinalis</i>	Skinjbir	Ginger	Roots	Powder/infusion	
Rutaceae	<i>Zygophyllum Fabago</i>	Aaggaya	Fabago	Seeds /Rootlets	Infusion/Decoction	

Thyme (*Thymus vulgaris*) was the most used species (72.19%), followed by cumin (*Cuminum cyminum*) (58.54%), then green anise (*Pimpinella anisum*) (50.73%), fenugreek (*Trigonella foenum-graecum*) (49.02%), verbena (*Verbena officinalis*) (46.82%)

and rosemary (*Salvia rosmarinus*) (40.73%). Leaves were the most used plant part (64.8%), while decoction was the most mentioned method of preparing therapeutic recipes (59.2%) (Figure 2).

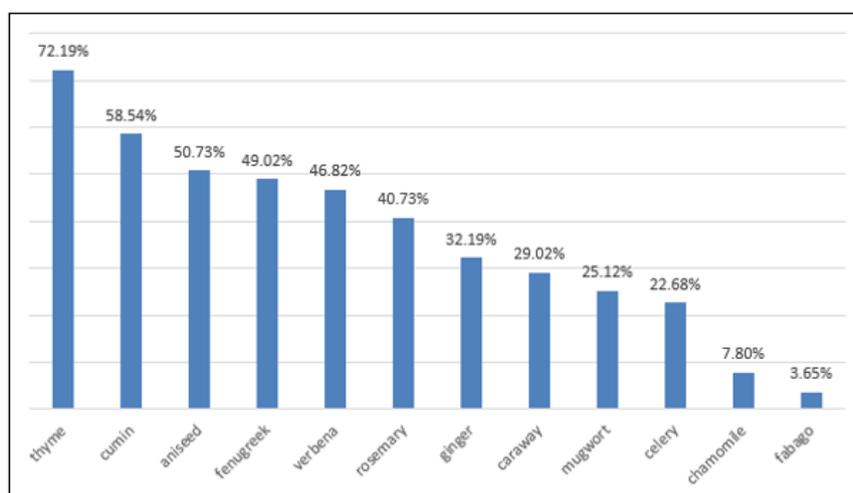


Figure 2: Distribution of medicinal plants according to the degree of use.

The majority of participants (70.9%) report that they use medicinal plants on demand and 14.3% use them until they are cured. Concerning the knowledge on the side effects of these plants: 60% of the participants report that there are no side effects related to these plants and 35.8% do not know if there are effects or not. Concerning the benefit of the use of plants in medication: 73.9% of the respondents report an improvement of the symptoms and 22.8% report that they lead to cure.

Discussion

The European Pharmacopoeia defines medicinal plants as plant drugs of which at least one part has medicinal properties. By extension, a « medicinal plant » or « plant » is often referred to not only as the botanical entity but also as the part used (leaf, flower, root, bark, flowering top...) [5]. Since ancient times, plants have been used by the Moroccan population for food and medicine. Indeed, Moroccan ethnobotanical studies have shown that 365 species of plants are used as food, medicinal, aromatic, condimentary and toxic and 500 preparations used to treat different pathologies are based on plants [6].

Digestive diseases are frequent and the use of phytotherapy to remedy these disorders is also frequent in Morocco. A recent Moroccan study has shown that the main plants used in the treatment of digestive disorders are represented by : cinnamon (*Cinnamomum zeylanicum*), mallow (*Malva sylvestris* L), licorice (*Glycyrrhiza glabra*), savory (*Saturejamontana*), calendula (*Calendula officinalis* L), aloe (*Aloe vera*), flax (*Linum usitatissimum* L), psyllium (*Plantago psyllium*), castor (*Ricinus communis*), senna (*Cassia angustifolia*), bistro (*Polygonum bistorta*), purple loosestrife (*Lythrum salicaria*), anise (*Pimpinella anisum*), tarragon (*Artemisia dracunculoides*) and lemon balm (*Melissa officinalis*) [7].

A study in the region of Fes-Meknes in Morocco showed that the most frequently used plants for acute digestive system problems were: *Foeniculum vulgare*, *Carum carvi*, *Glycyrrhiza glabra*, *Ammanniacum leucotrichum*, *Trigonella foenum-graecum* and *Coriandrum sativum*. According to this study, the symptoms justifying the use of the plants were acute abdominal pain, intestinal discomfort, bloating, diarrhea and constipation [8]. This is consistent with the results of our study. The use of leaves in the majority of preparations could be attributed to their availability, the simplicity of their harvest and their richness in therapeutic substances [9].

Study limitations

The study has some limitations. First, this study relied on a cross-sectional observational investigation. The data do not allow

conclusions to be drawn about the nature or direction of the associations examined. We also do not know whether this lower quality of life existed before COVID-19. Similarly, the online self-report questionnaires may be influenced by difficulties in completing them, which could affect the validity of the data provided. Given our recruitment methods and sample size, the results may not be generalizable to the entire Moroccan population and other countries. Nevertheless, the hypotheses reported could be targets for future studies.

Conclusion

Medicinal plants are often considered by the public as safe remedies, and less harmful than synthetic drugs, since they are natural. However, this is not always the case, because they can be toxic and cause tissue damage that can be life-threatening.

Acknowledgement

None.

Conflict of Interest

None.

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