MEDICINAL PLANTS WITH HEPATOPROTECTIVE ACTION USED BY RESIDENTS IN THE VARNA REGION (BULGARIA)

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ABSTRACT

INTRODUCTION: The use of medicinal plants for the prevention and treatment of liver disease is traditionally used around the world. Herbal therapeutic agents with hepatoprotective action have been used in Bulgaria for a long time. Despite the popularity of some medicinal plants, in our country there are still no targeted ethnobotanical studies on the knowledge of local residents about the use of medicinal plants with hepatoprotective action.

AIM: The aim of the present study is to establish the knowledge about the use of medicinal plants as hepatoprotectors by the locals of Varna city and the region.

MATERIALS AND METHODS: The survey was conducted through a face-to-face survey. A total of 171 locals from 10 settlements were interviewed. The obtained results are analyzed by a quantitative index for processing ethnobotanical and ethnopharmacological information.

RESULTS: Twenty-eightspecies of medicinal plants belonging to 27 genera of 19 families have been reported for use as hepatoprotectors. The most popular medicinal plants for the prevention and treatment of liver disease among the local population are *Cichorium intybus* L., *Silybum marianum* (L.) Gaertn. and *Taraxacum officinale* F.H.Wigg.

CONCLUSION: We report preserved ethnobotanical knowledge of the locals about the use of medicinal plants with hepatoprotective action. The choice of medicinal plants is most often consulted with a doctor. The data from this study can serve as a basis for research on Bulgarian species of medicinal plants in order to develop food supplements and pharmaceuticals for the prevention and treatment of liver disease.

Keywords: *medicinal plants, hepatoprotectors, ethnobotany*

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INTRODUCTION

Liver disease refers to a wide range of acute conditions caused by various damaging agents, such as viruses, toxins, alcohol, and pharmaceutical agents, as well as chronic liver disease, which over time can be fatal (1). The group of digestive diseases, to which liver diseases also belong, is one of the leading causes of death in Bulgaria in 2019 (2). The morbidity of the inhabitants in the city of Varna and the region from

this group of diseases does not differ significantly from the data at the national level (3).

The social and health significance of liver diseases determines the high role of prevention and treatment of these diseases. An important step in achieving positive results from prevention and treatment is the concomitant proper treatment with natural remedies, including medicinal plants. In recent years, many researchers around the world have studied the effects of plants traditionally used by local healers and herbalists to support liver function and treat liver disease (4,5,6). In most cases, research confirms traditional experience and wisdom by discovering the mechanisms and modes of action of medicinal plants, as well as confirming the therapeutic efficacy of certain plants or plant extracts in clinical trials (7,8,9).

Data on their use for the treatment and prevention of liver diseases have been published in many literature sources (10,11,12) for medicinal plants in Bulgaria. Despite the availability of rich and accessible information on medicinal plants with hepatoprotective action, studies on their knowledge and use by local communities in Bulgaria have not been conducted so far.

AIM

The aim of this study is to examine the knowledge about the use of medicinal plants used by local residents for the prevention and treatment of liver disease in Varna city and the region.

MATERIALS AND METHODS

The survey was conducted through a face-to-face survey. A total of 171 local residents from 10 settlements in the city of Varna and the region were surveyed—the cities of Varna, Aksakovo, Beloslav and the villages of Bliznatsi, Ezerovo, Kazashko, Topoli, Kumanovo, Kichevo, and Osenovo.

The survey was conducted randomly during the period September 2020–August 2021. A paper questionnaire was specially created for this purpose. Permission for conducting a survey with the participation of volunteers was obtained from the Commission on Ethics of Research at MU–Varna. Interviews were conducted after obtaining the prior informed consent of the participants, in accordance with the Code of Ethics of the International Society of Ethnobiology (13).

To determine the species of medicinal plants the Handbook for Plants in Bulgaria was used (14). The names of the taxa have been adopted according to the international nomenclature (15). The list of families is structured according to Angiosperm Phylogeny Group (16).

To process the obtained results, a quantitative index was used for processing ethnobotanical and ethnopharmacological information (17,18):

- The fidelity level (FL) index indicates the respondents' choice of a potential plant that treats a disease or is used for a specific purpose (19). It is calculated by the following formula:

$$FL\ (\%) = \frac{Np}{N} \cdot 100,$$

where Np is the number of responses for use of a particular plant species in a given category of application, and N is the total number of respondents who indicated the plant for any use. The fidelity level quantifies the significance of a species for a given purpose.

The information recorded during the study was included in a database for a larger ethnobotanical study.

RESULTS AND DISCUSSION

Of the 171 locals surveyed in the Varna region, it is found that 25 (16%) state that they use medicinal plants with hepatoprotective and therapeutic effects. The remaining 146 (84%) respondents do not use medicinal plants under this application. The significantly higher number of locals who do not have knowledge of the use of medicinal plants in the prevention and treatment of liver is explained by the fact that this application is very specific. Respondents who report the use of medicinal plants usually start looking for information on alternative, complementary and environmentally friendly treatment only after receiving a diagnosis or suspicion of it from a specialist.

1. Medicinal Plants Used

The locals in the city of Varna and the region use 28 species of medicinal plants from 27 genera of 19 families (Appendix) for the treatment and pro-

tection of liver diseases. Most of the plants cited by locals with hepatoprotective action and receiving a high FL are popular medicinal plants in Bulgaria with well-studied medicinal properties (10, 11, 12, 20). The most popular among the respondents with liver problems are the medicinal plants: *Cichorium intybus* L. (FL 92), *Silybum marianum* (L.) Gaertn. (FL 88), and *Taraxacum officinale* F.H. Wigg. (FL 80). The results obtained are expected and logical, because these medicinal plants have a pronounced and proven effect on liver health (1, 9, 11, 21). This result gives us reason to report high awareness among locals about the choice of medicinal plants with hepatoprotective action.

A significant number of responses (FL) for use is obtained for another 8 species of popular medicinal plants (10, 11): *Agrimonia eupatoria* L., *Chelidonium majas* L., *Crataegus monogyna* Jacq., *Hypericum perforatum* L., and others.

For the other 17 species of medicinal plants (Appendix) we report lower popularity as hepatoprotectors among the local population of Varna and the region.

It is an interesting fact that the locals do not report the use of medicinal plants typical for the Bulgarian flora with proven hepatoprotective properties such as: *Anethum graveolens* L., *Glycyrrhiza glabra* L., *Hippophae rhamnoides* L., *Vitis vinifera* L., *Galium aparine* L., *Nigella sativa* L. (22), and *Convolvulus arvensis* L. (5). This result shows that the locals do not know and do not use the resources of the area in which they live, and also that they do not rely on the use of medicinal plants as the main means of prevention and therapy.

It is interesting to use the bark of different oak species (FL 40) for the treatment of liver diseases by locals in Varna and the region. Respondents have no knowledge of the species of oak they use. The use of oak bark in folk medicine has long been known and described in many popular sources (12, 20). The ethnobotanical application of oak bark among the population in Bulgaria is described (23). So far, however, there are no published ethnobotanical data for Bulgaria on the use of native oak bark in the treatment of liver disease. For comparison, the ethnobotanical use and studies on the phytochemical composition of oak species for the treatment and prevention of liver diseases has been well studied by some foreign authors (4, 6, 24). For example, Taib et al. (6) describes two species of oak—*Quercus liaotungensis* Koiz. and *Q. dilatata* Kern., distributed in the Kingdom of Morocco, which have stronger antiproliferative effects than the reference silymarin (*Silybum marianum* (L.) Gaertn. and suggests a high potential for development. According to Zhao et al. (24) *Q. dilatata* Kern has remarkable pharmacological potential as it has a protective effect, restoring inflammation of the liver.

Bulgaria is a natural habitat of 17 *Quercus* species (25), which have not been studied so far for the content of active substances with hepatoprotective action. This gives us reason to believe that future biochemical and pharmaceutical research on Bulgarian oak species would find application as hepatoprotective agents.

The results of this study for the first time report the use of *Trigonella foenum-graecum* L. (FL 48) for the treatment of liver disease in Bulgaria. Its use as a hepatoprotector has been reported by some foreign authors (26).

2. Use of medicinal plants by sex:

The results of the survey show that the distribution of respondents who have knowledge of the use of medicinal plants with hepatoprotective action by sex show significantly greater knowledge among women than among men (Fig. 1).

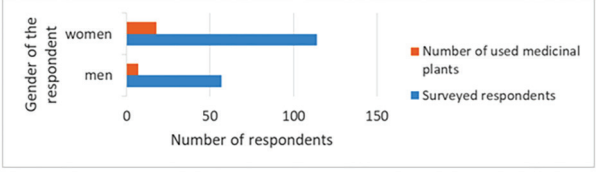


Fig. 1. Use of medicinal plants according to the gender.

This result is explained by the fact that the knowledge and use of herbs is generally considered by local people to be a "woman's job", which explains the greater ethnobotanical knowledge of women compared to men. The obtained results correlate with other ethnobotanical studies (27,28).

3. Use of medicinal plants according to the level of education

The distribution of respondents according to the level of education shows a lack of knowledge among residents with a low level of education who

have knowledge about the use of medicinal plants for this application (Fig. 2).

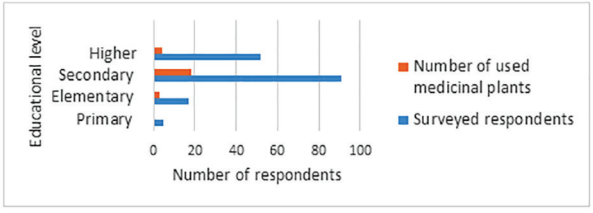


Fig. 2. Use of medicinal plants according to the educational level.

The share of local residents with secondary education using medicinal plants as hepatoprotectors is the highest. This result is explained by the fact that more highly educated people appreciate and seek more often a natural lifestyle and apply more frequently herbs for the treatment and prevention of liver diseases. Similar results have been cited in other ethnobotanical studies (27,28).

4. Use of medicinal plants according to age group

The results show that the knowledge of the use of drugs with hepatoprotective and therapeutic action increases with the increase in age of the respondent (Fig. 3).

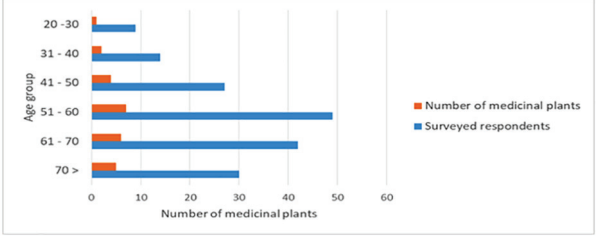


Fig. 3. Use of medicinal plants according to the age group.

This result is explained by the fact that there is an increase in the incidence of morbidity with age (National Statistical Institute) and it is not associated with the accumulation of knowledge over time. The difference in the results of a study on the use of medicinal plants in human medicine for the region of the Northern Black Sea coast (29) is also logical.

5. Use of medicinal plants according to the source of information

The largest number of respondents (35.12%) answered that they received information about the action of medicinal plants from their older relatives (Fig. 4). This fact proves the continuity between generations and preserved ethnobotanical knowledge of traditional medicine, as well as that the locals have knowledge of the use of specific medicinal plants for the prevention and treatment of specific diseases.

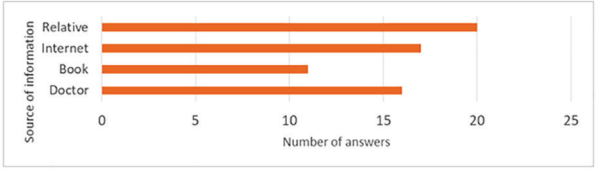


Fig. 4. Source of information for the use of medicinal plants.

As a positive fact we consider the result that over 50% of the answers are received from respondents who take medicinal plants after consulting a doctor. The media and books on medicinal plants also make a significant contribution. The use of books as a source of information about medicinal plants is more often reported by people with higher education.

6. Use of medicinal plants according to the frequency of use

The largest share of respondents answer this question with "Combination therapy with herbs and synthetic drugs prescribed by a doctor" (Fig. 5). This result confirms the hypothesis that the respondents use medicinal plants as an adjunct to the main therapy. An important fact in the results of this question is that respondents use medicinal plants after consulting a doctor, as the

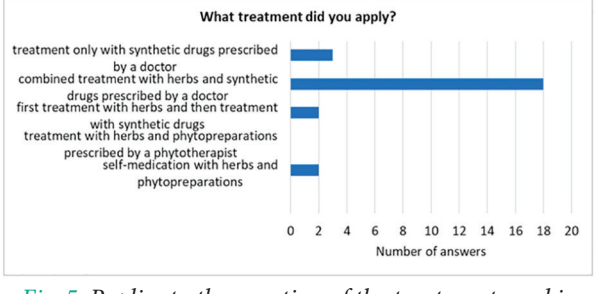


Fig. 5. Replies to the question of the treatment used in case of liver disease.

choice of a particular herb, method of preparation and dose are decisive for the future development of the disease and exclude the possibility of improper self-medication.

7. Use of medicinal plants according to their usable part

With regard to the **usable part of the medicinal plant**, the local population in the city of Varna and the region has traditional ethnobotanical knowledge about the application of the most appropriate part of the medicinal plant for a specific health problem. For the usable part of medicinal plants as hepatoprotectors we found the following results (Appendix): The most common is the use of stalks—in 10 species of medicinal plants, root—in 3 species, the other usable parts are listed respectively two times and one time.

APPENDIX

Medicinal plants used by locals for the prevention and treatment of liver disease

Family	Scientific name	UR;FL(%)	Plant parts used
Acoraceae	*Acorus calamus* L.	3 (12)	roots
Apiaceae	*Foeniculum vulgare* Mill.	19 (76)	seeds
Asphodelaceae	*Aloe vera* (L.) Burm.f.	1 (4)	stalk, juice
Asteraceae	*Cinara cardunculus var. scolumus* L.	1 (4)	flower
Asteraceae	*Silybum marianum* (L.) Gaertn.	22 (88)	seeds
Asteraceae	*Taraxacum officinale* F.H.Wigg.	20 (80)	roots, stalk
Asteraceae	*Matricaria chamomilla* L.	5 (20)	flower
Asteraceae	*Cichorium intybus* L.	23 (92)	roots, stalk
Asteraceae	*Rosa canina* L.	2 (8)	flower, fruit
Asteraceae	*Agrimonia eupatoria* L.	18 (72)	stalk
Berberidaceae	*Berberis vulgaris* L.	5 (20)	roots
Brassicaceae	*Brassica rapa* L.	1 (4)	root crop
Cannabaceae	*Humulus lupulus* L.	15 (60)	fruit
Caprifoliaceae	*Sambucus ebulus* L.	2 (8)	fruit
Equisetaceae	*Equisetum sp.*	12 (48)	stalk
Fabaceae	*Ononis spinosa* L.	16 (64)	roots
Fabaceae	*Trigonella foenum-graecum* L.	12 (48)	leaves
Fagaceae	*Quercus sp.*	10 (40)	bark
Geraniaceae	*Geranium sanguineum* L.	10 (40)	rhizome
Hypericaceae	*Hypericum perforatum* L.	17 (68)	stalk
Lamiaceae	*Betonica officinalis* L.	1 (4)	stalk
Lamiaceae	*Mentha piperita*L.	9 (36)	stalk
Lamiaceae	*Mentha spicata* L.	19 (76)	stalk
Moraceae	*Ficus carica* L.	11 (44)	leaves, fruit
Papaveraceae	*Chelidonium majas* L.	14 (56)	stalk
Rosaceae	*Crataegus monogyna* Jacq.	16 (64)	flower, fruit
Urticaceae	*Urtica dioica* L.	5 (20)	leaves
Zingiberaceae	*Zingiber officinale* Roscoe.	1 (4)	rhizome

Legend:
UR—number of answers
FL (%)—fidelity level index

When conducting the survey, we registered a positive attitude of the respondents to the use of ready-made pharmacological preparations. Locals often prefer to use a finished product in the form of a food supplement or extract, as this saves time.

CONCLUSION

The study shows high awareness of those local residents who use medicinal plants with hepatoprotective and therapeutic action. The locals of Varna and the region use 28 species of medicinal plants from 27 genera of 19 families. The search for information on suitable medicinal plants begins after a diagnosis of liver disease. The choice of medicinal plants is most often consulted with a doctor. We report preserved ethnobotanical knowledge of the locals for the use of medicinal plants with hepatoprotective action. The data from this study could serve as a basis for pharmacological research on Bulgarian species of medicinal plants in order to develop food supplements and pharmaceuticals for the prevention and treatment of liver disease.

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